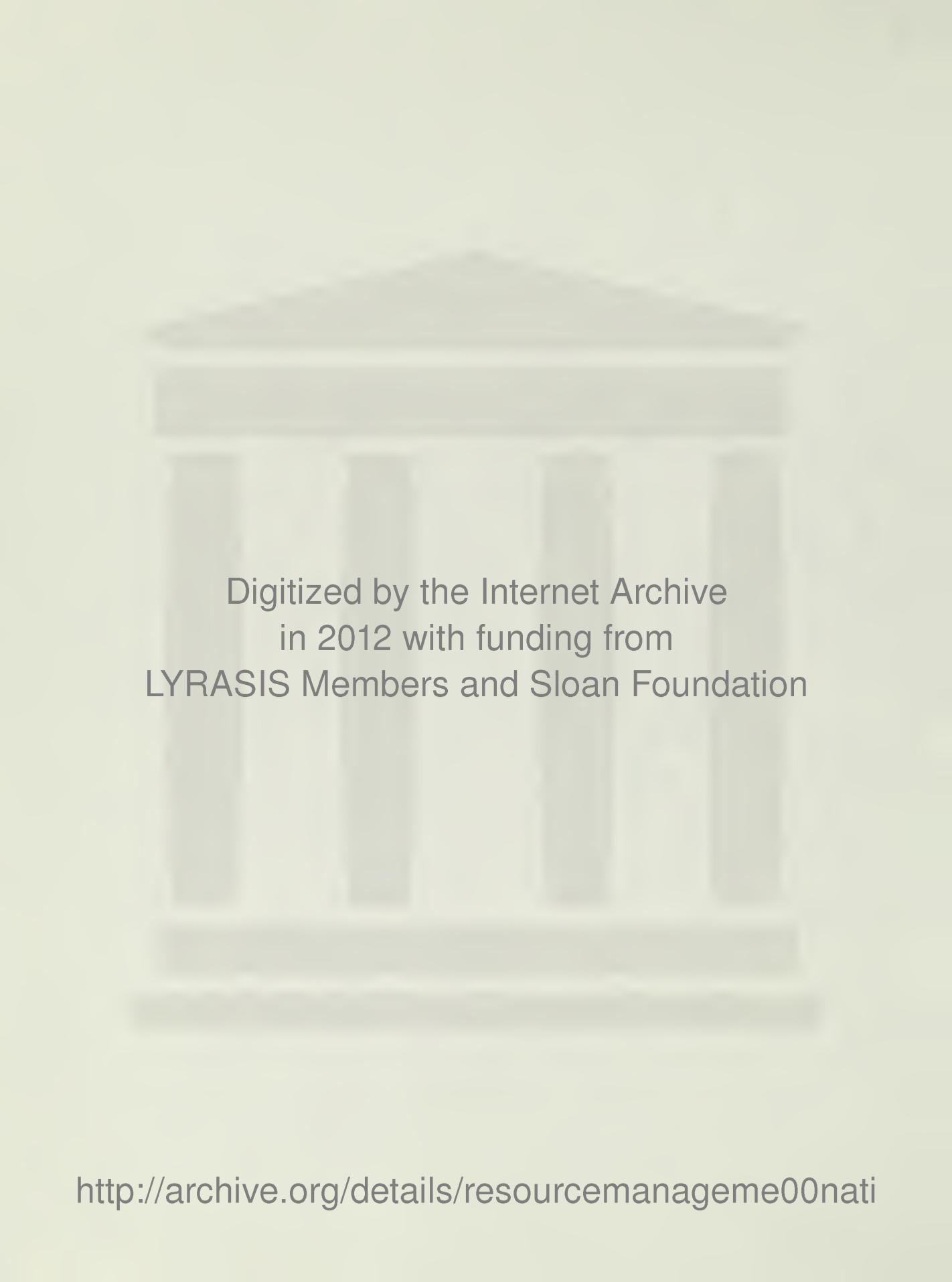
DRAFT

RESOURCE MANAGEMENT PLAN

KENAI FJORDS NATIONAL PARK

Recommended by: _____ _____
Superintendent Date

Approved by: _____ _____
Regional Director Date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I. INTRODUCTION

Kenai Fjords National Park encompasses about 669,500 acres of magnificent subarctic mountain, coastal scenery along the southeast side of the Kenai Peninsula. [The park Land Protection Plan (NPS 1988) reports that about 19,600 acres have been conveyed to the State of Alaska and private landowners and another 77,000 acres are being selected by Native Corporations.] About half of the acreage is covered by the Harding Icefield and adjacent glaciers which feed into and adorn the steep, rugged fjords and valleys. The abundance of fresh water and circulation of sea water by the Alaska Coastal Current provide for a rich coastal and marine environment. Seward serves as the gateway city to the park since it is connected to Anchorage, the state population and supply center, by state highway and railroad. The park is accessible by gravel road from the highway, marine waters, and air. Because of its location, accessibility and dramatic resources, the park has become one of the most visited national parks in Alaska.

Geologic formations in the park exhibit evidence of drastic and impressive change. Rock walls along the outer coast of folded sedimentary strata attest to tremendous tectonic forces. Bold headlands composed of intrusive igneous rock resist erosion, as they have through the ages. Glaciers have advanced and receded carving out deep valleys which in many cases filled with sea water forming steep-sided, narrow fjords. Land subsidence from tectonic activity such as the Great Alaska Earthquake have submerged many of the glacial cirques at the outward ends of the peninsulas.

The subarctic, maritime climate yields a tremendous amount of precipitation, much of it in the form of snow. Successive years of heavy snow have led to the formation of glaciers and the Harding Icefield which mantles the spine of the Kenai Mountains. Storms from the Gulf of Alaska lash the coast with strong winds and heavy doses of precipitation which lead to flood events, particularly during autumn. Temperatures are cool but moderated by proximity to the ocean.

Wildlife and fish add life to this imposing landscape. Marine mammals which inhabit coastal seas and shores include humpback whales, grey whales, killer whales, Dall's porpoise, Steller sea lions, harbor seals, and sea otters. Seabirds such as puffins, murres and black-legged kittiwakes breed along rocky cliffs of the fjords and offshore islands. Less common species such as the marbled murrelet and the peregrine falcon also breed along the coast. Bald eagles soar over ridges and nest in coastal Sitka spruce and hemlock. Anadromous fish including five species of Pacific salmon and dolly varden spawn in drainages along the fjords. Black bear roam the slopes and valleys in search of edible vegetation and salmon. Mountain goats traverse rock faces

and forage on alpine vegetation throughout the park.

At Exit Glacier a new bridge and road were completed in 1986 creating easier access and increased visitation. In 1987 visitor facilities were completed including a paved handicap access trail and wayside exhibits. Trails to the glacier and the Harding Icefield have been developed in recent years to provide additional access, visitor safety, and resource protection.

Former visitors and inhabitants to the park area included Native people along the coast, fur hunters and trappers, prospectors in the valleys and gold miners in the fjords. The Unixkugmiut, a little-known tribe of southern Eskimo, inhabited protected bays along the coast. Russian traders and merchants settled on the Kenai Peninsula including Resurrection Bay near Seward where they built the first ship in Alaska and directed fur hunting and trading activities. American traders and trappers soon followed as attested by dilapidated log cabins. Gold miners rushed to the Nuka Bay area in the 1920's and 1930's to establish lode gold claims and mines. Commercial fishing for salmon and bottomfish has occurred for almost 50 years along this coast.

Cultural resources in the park consist of prehistoric and historic sites and artifacts. Prehistoric sites include villages, hunting camps, culturally modified trees, and various artifacts. Eskimo masks were discovered by Herring Pete in the 1920's somewhere along the mainland of the coast (McMahan and Holmes 1987). Equipment and cabins from the gold mining activities lie scattered about the coast and woods in the Nuka Bay area. One standing, and remains of several collapsed, trapper and prospector cabins adorn the west side of the Resurrection River valley in the park.

Despite prehistoric and historical use of the park area, the harsh climate and active earth processes such as glaciation, tectonics, and flooding quickly erase evidence of human activity. The untrammeled, undeveloped and wild condition of the vast majority of this landscape readily qualifies it for wilderness. In the General Management Plan (NPS 1984) 99 percent of the park was found to be suitable for wilderness designation. Of that area 88 percent or 587,345 acres were recommended for wilderness classification in the Final Environmental Impact Statement (NPS 1988). The Department of the Interior has not yet acted upon those recommendations.

The park has become known for its spectacular coastal scenery, an abundance of coastal and marine wildlife, the accessible Exit Glacier area and the expansive Harding Icefield. A great deal of media attention was given to the park as a result of the oil spill from the T/V Exxon Valdez. Recreationists from around the nation and the world travel to this park to observe and enjoy its raw beauty and teeming wildlife. They travel on anything from

luxury cruise ships to sea kayaks, tour buses to mountain skis.

A. LEGAL GUIDELINES

Congress created the National Park Service in 1916 to

> "...promote and regulate the use...by such means and measures to conform to the fundamental purposes...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (NPS Organic Act, 16 USC 1).

Resource management policies and philosophies are derived from this founding language and supplemental Congressional declarations.

The National Parks and Recreation Act of 1978 ("The Redwoods Act", 16 USC 1a-1) further defined and amended the NPS Organic Act by stating:

> "The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in the light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided for by Congress."

Various authorities relating generally to park areas also apply if the general legislation does not conflict with the specific provisions. Extensive specific exceptions for Alaska national park areas are contained in the Alaska National Interest Lands Conservation Act of 1980 (16 USC 3101 et seq). Minus these specific legislative exceptions, general NPS legal mandates and policies apply (NPS Management Policies, 1988).

Congress created Kenai Fjords National Park in 1980 when it passed the Alaska National Interest Lands Conservation Act (ANILCA), Public Law 96-487. Section 201 (5) of this act specifies:

> The park shall be managed for the following purposes, among others: To maintain unimpaired the scenic and environmental integrity of the Harding Icefield, its outflowing glaciers, and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes. In

a manner consistent with the foregoing, the Secretary is authorized to develop access to the Harding Icefield and to allow use of mechanized equipment on the icefield for recreation.

Section 101 of ANILCA describes general purposes for conservation units established by the act of which parts (a), (b), and (d) apply to Kenai Fjords National Park. Purposes which apply are:

Preserve lands and waters for the benefit, use, education, and inspiration of present and future generations.

Preserve unrivaled scenic and geological values associated with natural landscapes.

Provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value.

Preserve in their natural state extensive unaltered ... rainforest ecosystems.

Protect and preserve historical and archeological sites.

Preserve wilderness resource values and related recreational opportunities.

Maintain opportunities for scientific research and undisturbed ecosystems.

Subsistence activities are allowed in ANILCA section 101 (c), but subsistence uses are not allowed within Kenai Fjords National Park. Section 201 (5), which established Kenai Fjords National Park, contains no language specifically permitting subsistence uses, whereas other sections establishing other national parks in Alaska do contain language specifically permitting subsistence uses.

Federal regulations as promulgated in Title 36, Chapter 1, Code of Federal Regulations also direct management and use of national park units. Part 2 of these regulations pertain to national parks in general, and part 13 pertains specifically to national park system units in Alaska. As stated in 36 CFR 13.67, "subsistence activities are prohibited in Kenai Fjords National Park."

B. PURPOSE OF PLAN

This Resource Management Plan (RMP) documents the park's natural and cultural resources, describes and evaluates the current resource management activities, prescribes an action program and identifies funding and personnel needs.

The RMP serves as a guide for the continuous protection, management and maintenance of natural and cultural resources in Kenai Fjords National Park. It describes how the NPS will implement resource management objectives described in the Statement for Management (1982) and General Management Plan (1984). These guiding documents were derived from the NPS Organic Act of 1916, the enabling legislation, management policies and existing authorities.

Besides containing some relatively constant information, the document must be updated periodically to reflect operations evaluations, periodic assessments of resource status, research and resource management actions to date, and changing impacts and legal constraints. The document must be updated at least once every four years, and funding sheets and tables are updated annually. Revisions and additions also occur as a result of input from local, State or federal agencies and the public.

The RMP sets priorities and helps guide managers in requests for funding. Priority setting and funding requests are updated each year.

Specific activities resulting from this program document are being developed in consultation with the State of Alaska and other appropriate cooperating agencies and institutions. To enhance the spirit of cooperation and coordination of resource management activities, the NPS and State established formal procedures involving the State in the development and review of resource management plans for national park units in Alaska. Comments will also be solicited from other federal resource management agencies and Native groups with resource management concerns. The goal is to involve knowledgeable individuals and groups at each step in development of the plan or projects. A list of persons and agencies contacted during development of the plan will be provided with each edition. The final draft plan will be made available for public review for a period of thirty days. The review period will be announced in local media. After adjustments are made following the public and agency review period, the resource management plan is sent to the Regional Director for approval.

The Department of Interior NPS Management Policy (1988) states:

> "All NPS programs affecting cultural resources are subject to the provisions of the National Historic Preservation Act (16 USC 470 et seq.), the National Environmental Policy Act (42 USC 4371 et seq.), the American Indian Religious Freedom Act (42 USC 1996), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency

Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46). Other applicable management procedures are detailed in the Cultural Resources Management Guideline (NPS-28)."

The NPS Management Policy (1988) also prescribes what consultation must take place prior to activity which may affect cultural resources:

> "Other federal agencies, state and local governments, potentially affected native American and other communities, interest groups and entities specified by law or regulation, including state historic preservation officers and the Advisory Council on Historic Preservation, will be given opportunities to become informed about and comment on anticipated NPS actions at the earliest practicable time. The National Park Service will also encourage the continuing informal exchange of views with concerned local communities on cultural resource matters."

When necessary, environmental assessments will be prepared in accordance with the National Environmental Policy Act (NEPA). Categorical exclusions will be filed for each applicable project prior to implementation.

Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service if a proposed action may affect endangered species or their habitat.

C. OBJECTIVES

The resource management program at Kenai Fjords National Park attempts to fulfill the broad legislative purposes described in ANILCA. Program objectives are assimilated from appropriate sections of the park's Statement for Management and the General Management Plan. Specific program objectives are to:

> Manage resources in such a manner that the integrity of natural ecosystems such as coastal rainforests are maintained in their natural state in perpetuity.

I think these are to specific

> Allow natural processes, including floods and avalanches, to determine the shapes and substances of the natural environment while protecting human life, private property, cultural sites, and endangered or threatened species.

> Cooperate with knowledgeable individuals, groups, institutions, and agencies in collecting the most current and complete information and data about the natural resources, including climate, weather, glaciers, glacial activity, geology, soils, plants, vegetation, fish and wildlife and the effects of motorized equipment and vehicles

on the natural resources.

Work cooperatively with the Alaska Department of Fish and Game, Alaska Department of Public Safety - Fish and Wildlife Protection Division, Alaska State Parks, U.S. Fish and Wildlife Service, and the U.S. Forest Service to monitor populations of fish and wildlife and their habitat for the purpose of protecting and preserving these resources.

Develop interpretive information and programs to increase visitor appreciation of resource values. Increase public awareness of ways to avoid damaging plants, fish and wildlife habitat, historic and archeological sites, scenic vistas and research opportunities.

Monitor significant resource problems and threats within or adjacent to park boundaries to prevent adverse impacts on natural and cultural resources.

Manage mining activities to minimize damages to natural and cultural resources. Restore disturbed landscapes that are not integral to the interpretation of historic mining activity.

Identify and remove hazardous wastes that jeopardize human safety and the integrity of natural and cultural resources.

Identify, document, and evaluate cultural sites to develop the park's database, appropriate research programs and plans for resource protection, preservation and interpretation.

Complete National Register nominations for significant cultural sites.

Cooperate with park-associated Native groups in research, resource management and interpretation of cultural resources.

Assemble cultural resources data and information to be used in interpretive materials and programs for the enjoyment and education of visitors, park-associated Natives groups and the interested public.

Collect oral, written, and photographic documentation from local informants to preserve important historical and ethnographic information pertinent to the park area.

Ensure that museum collections are maintained in accordance with professional curatorial standards and NPS policies. Encourage legitimate research use of these collections.

Protect all resources from vandalism and unauthorized

excavation or collection with periodic surveillance, interpretive programs, and law enforcement.

II. PRESENT RESOURCE STATUS

A. NATURAL RESOURCES

1. RESOURCE DESCRIPTION

Kenai Fjords National Park encompasses a scenic coastal mountain system on the southeastern flank of the Kenai Peninsula. The peninsula protrudes southward into the Gulf of Alaska where it lies perpendicular to the Alaska Coastal Current which sweeps counterclockwise along the coast. Major storm tracks circulate northward from the Gulf carrying moisture-laden air masses. The park area receives tremendous amounts of precipitation, most of it as snow. Long term weather records in Seward and other communities on the peninsula indicate a possible shift toward a warmer, wetter local climate.

Almost one vertical mile above the Gulf of Alaska, the Harding Icefield mantles all but the summits of the central Kenai Mountains. Over half of this Ice-Age remnant lies within the boundaries of the park, the remainder lies in the Kenai National Wildlife Refuge. Like arms of a sea star, glaciers flow outward in all directions from the icefield. To the southeast they descend to the fjords, some calving directly into the sea. These glaciers hew the valleys between jagged ridges, and the deep water fjords enlarge when ocean waters replace receding glaciers. Glaciers in the area appear to be receding in their lower reaches, but thickening at higher altitudes (Bredthauer and Harrison 1984, Mayo et al 1985, and Rice 1987).

Mountain ridges extend into the Gulf of Alaska, their seaward ends submerged by tectonic forces so that only jagged islands project above sea level. Scalloped, steep, rocky peninsulas indicate drowned glacial cirques. Ghost forests lining beach areas show where the land mass dropped suddenly 6-8 feet from the Great Alaska Earthquake of 1964 bringing salt water to tree roots (Pflaker 1969). Interstadial trees in areas adjacent to the fjords provide evidence of past forests since buried by glacial till and later exposed by erosion of sediments.

Mature rain forests of Sitka Spruce and hemlock now clothe the outward ends of the peninsulas. The western most range extension of the western hemlock occurs at the southwestern tip of the Kenai Peninsula. Stands of black cottonwood line inland waterways such as the Resurrection River and Nuka River.

A shrub layer composed mostly of Sitka alder separates the forest and alpine tundra. One alpine species, the pale poppy (Papaver alboroseum) qualified as a candidate for endangered and

threatened status (Murray and Lipkin 1987). Primary plant succession is rapidly reclaiming recently deglaciated areas. An exceptional opportunity to interpret successional patterns and processes exists at Exit Glacier.

Wildlife and fish populations expand or retract naturally in response to climate and habitat change. Increased snow often decreases mountain goat survival rates. Receding glaciers and plant succession create new habitat for many species such as mountain goats and moose. Colonies of gulls and terns have appeared on recently exposed islands. Salmon species, including the commercially valuable sockeye salmon, have recently colonized drainages in the fjords exposed from glacial recession this century. Bald eagles and black bear populations concentrate at these developing fisheries. Sea otters congregate in shallow lagoons and protected bays but forage farther up fjords as food sources develop. Harbor seals haul out on icebergs calved from changing tidewater glaciers where they bear pups and molt. The Kenai Peninsula race of the Canadian lynx occurs rarely in the northeastern part of the park and is listed as a category II candidate for endangered and threatened status (Amarol pers. com.).

Human-induced environmental changes also affect wildlife habitat and survival. The oil spill from the T/V Exxon Valdez drastically altered the natural environment along the park's coast and killed thousands of seabirds which nest seasonally on mainland cliffs and offshore islands where ocean currents sweep by food-rich waters. Sea otters died by the hundreds from oil which matted their fur and poisoned them from subsequent ingestion. Commercial fishing in waters adjacent to park shores directly impacts fish populations and may indirectly affect wildlife populations. Harbor seal and Steller sea lion populations have plummeted possibly due to competition with humans for fish resources. The National Marine Fisheries Service classified the Steller sea lion as a threatened species in 1990. Whale species such as humpback, grey and fin are listed as endangered species which move through offshore waters. (The Grey Whale is being considered for delisting in 1992.) They face encroachment on their summer feeding grounds by increasing vessel traffic.

The vast majority of the land base remains untainted, and that which was impacted by oil has been treated to the best of human capability. The park offers unusually fine opportunities to enjoy a piece of wild, unspoiled coastal North America. This lively wildness lends a rare quality to the landscape which appeals to humanity's need to know that unaltered places yet exist and remain to be discovered and enjoyed.

2. ISSUES

The primary mission to preserve the scenery, wildlife and wildlife habitat free from human disturbance must be balanced with allowances for public enjoyment of the resource values. ANILCA specifically allows the Secretary to authorize mechanized use on the Harding Icefield for recreation. Other recreational activities on park lands and adjacent to the park enhance public appreciation but may also contribute to disturbance of wildlife and scenic values. Commerce or transportation on the Pacific Ocean can provide the means for profound human-caused disturbance to the natural environment as demonstrated by the oil spill of the T/V Exxon Valdez. Global climate change may stimulate yet another level of human-induced environmental change. Before the effects of human disturbance can be adequately assessed, the diversity, richness and condition of the resources must be sufficiently inventoried and monitored. A scheme for resource monitoring must enable detection of natural trends and variation.

A dominant issue involves the lack of sufficient natural resource baseline information. Agency ignorance must be considered one of the greatest threats to maintenance of ecosystem integrity. Managers need high quality resource information to weigh alternatives and to steer human activities to the least damaging courses of action. As noted earlier some natural resource baseline information is available, but much more is needed to prepare for impending management decisions.

A primary management and resource concern for the park involves Native selection of about 76,000 acres of coastal lands. These lands contain fish habitat, wildlife habitat, rain forest communities, recreational sites, historic and archeological sites, and mineral deposits. Development activities could include aquaculture and fishery enhancement, hunting, coastal lodges, logging, and mining. This emphasis runs counter to the purposes for which this nationally recognized park was established.

As recreation and tourism continue to increase in the park, pressures on wildlife habitat, soils, and water quality mount. Public concern grows as vessels closely approach endangered marine mammals such as humpback whales, grey whales and Steller sea lions. Aircraft may likewise disturb wildlife such as mountain goats and visitors on the ground. Clearly defined and enforced regulations can protect wildlife from overly aggressive viewers. Impacted soils and erosion have begun to appear at popular camping sites and trails. Public drinking water at water pumps and in backcountry settings should be tested periodically as human use increases. Education on front country and backcountry etiquette is essential.

Mining in Alaska National Parks has become a major issue in the last decade, and mining has and still does occur in Kenai Fjords National Park. Lode gold mining claims exist in the Nuka Bay

district which require periodic surveillance. Claimants must produce and adhere to approved plans of operation which require environmental safeguards to protect water quality, fish and wildlife habitat, and cultural resources. Operations frequently involve the use of heavy equipment, explosives and hazardous chemicals.

Harvest of floating glacial ice in the fjords has recently become an issue. Though outside park jurisdiction when collected, glacial ice provides important haul out and breeding habitat for harbor seals which the park is mandated to protect. Ice harvest activity also produces noise which intrudes upon wildland recreation pursuits. This activity must be closely monitored to ensure it does not adversely affect the purposes for which the park was created. Cooperation with the State is needed to develop and enforce strict permit conditions regarding this activity.

If humans continue to introduce carbon dioxide, chlorofloro-carbons and other gases into the atmosphere, global climate patterns are expected to change which may affect resources in the park. In particular, glaciers are expected to change in extent and behavior since they integrate the primary climatic factors, temperature and precipitation. Changing weather patterns could also affect hydrologic systems and frequency of earth processes such as snow and rock avalanche, flooding, beach deposition and erosion. These changes in turn could have profound affects on flora and fauna.

Many more issues face park management, and the above major issues will change as conditions change and solutions to issues are devised. A more complete listing of issues was identified in the context of service-wide issues that were discussed by a joint state/federal scoping group.

B. NATURAL RESOURCE BASELINE INFORMATION

Weather records from Seward since the early 1900s (National Weather Service 1990) represent the only consistent long-term monitoring data. Maps of glacier termini and photographs from a few locations represent discontinuous data sets dating from Russian occupation in the 1800s (Teben'kof 1852) and U.S. Geological Survey in the early 1900s (Grant and Higgins 1913). The park established a year-round weather station at Exit Glacier in 1982 and a stream profile gage station there in 1987, both in cooperation with the National Weather Service. Sloan (1985) published a succinct report on water resources and hydrologic hazards in the Exit Glacier area. Snow survey courses were established at Nuka Pass for the Bradley Lake Hydropower Project and at Exit Glacier in 1987 in cooperation with the U.S. Soil Conservation Service who publishes records monthly (Soil Conservation Service 1990). Rangers have recorded precipitation

and maximum and minimum temperatures during the summer season in Nuka Bay and Aialik Bay since summer 1983.

Very little baseline data is available for vegetation in the park. Ahlstrand (1983) produced an unpublished report on tree-ring analysis for the Exit Glacier area. Park seasonals have gathered some data on vegetation in the Exit Glacier area, particularly to monitor impacts along trails. Dot Helm (in progress) has obtained NPS funding to describe the successional sequence in the Exit Glacier area, and she obtained an NSF grant to study the role of mycorrhizae in primary plant succession in a recently deglaciated area near Exit Glacier (in progress).

A dearth of wildlife population data for mountain goats, black bear and other terrestrial species existed prior to establishment of the park. Mountain goat populations have been assessed three times since establishment of the park (Singer and Lovaas 1981, Adams 1986, and Rice and Adams 1990), but population data for bears, otters, wolverine, coyote or other land mammals has not been obtained. Marine mammal and seabird populations along the coast of the park have been surveyed repeatedly during summer in cooperation with the U.S Fish and Wildlife Service (Bailey 1976, Nishimoto and Rice 1987, and Bailey and Rice 1989). In 1980-81 the NPS supported a university study of boating activity impacts on harbor seals and glaucous-winged gulls in Aialik Bay (Murphy and Hoover 1981). Janik and Schempf (1985) surveyed Peale's peregrine falcon along the coast of the park. Park Rangers have surveyed bald eagle nesting sites and a few discrete gull colony sites on an annual basis in recent years.

A considerable degree of baseline information on coastal resources was generated as a result of the oil spill from the T/V Exxon Valdez. Spring populations of seabirds and marine mammals were assessed which had not been previously accomplished (Vequist and Nishimoto 1990). Intertidal flora and fauna were documented for the first time along the park's coast. And, fishery resources such as formerly unknown salmon runs, were documented. All of these findings poignantly illustrated the need for comprehensive baseline information and resource monitoring.

The Harding Icefield and adjacent glacier systems represent large, but unusually low elevation ice masses which could respond drastically to climate changes. Data in Meier (1984) indicates that glaciers around the Gulf of Alaska may have contributed significantly to global sea level change during the last century. A reconnaissance study of the Harding Icefield was conducted in summer of 1985. Also in summer 1985 remote automatic cameras were installed in two locations around Exit Glacier to monitor its movement and behavior (Rice 1987). At least two programs using stakes to measure changes in terminus positions of Exit Glacier have been initiated since establishment of the park. NASA aerial photographs and Landsat satellite imagery have been

indexed for the park area which show changes in areal extent of glaciers. About 5% of the ice-covered area in the vicinity of the Harding Icefield system dissipated between 1950 and 1984 (Rice 1987). Glacial geologists have conducted research on interstadial trees in the Nuka Bay area to help reconstruct past positions of glaciers and climatic regimes (Wiles and Calkins 1989).

In recent years the U.S. Geological Survey has been conducting mineral surveys and geological mapping in the Seldovia Quadrangle, including areas in the park, under the auspices of the Alaska Mineral Resource Assessment Program (AMRAP). A final report and geological map is expected sometime in 1993.

Most of the adjacent lands are managed by public land management agencies such as the Alaska Department of Natural Resources and the U.S Fish and Wildlife Service. Five inactive, unpatented mining claims, one Native allotment and one five acre private inholding dot the park landscape to date. Native corporations have selected up to 76,000 acres of land along the park's coast which could then be logged or otherwise developed.

From a comprehensive management perspective, these dynamic subarctic coastal ecosystems need to be better understood to evaluate changes from human impacts from afar and nearby. Since future impacts often cannot be fully anticipated, a relatively diverse inventory and focused monitoring system must be developed.

Table 1 reflects important needs for increased natural resource information for management purposes.

TABLE 1. Natural Resource Baseline Information

RESOURCES	PRESENT DATABASE	DOCUMENTATION OF HUMAN INFLUENCES	NEED FOR INFORMATION
Air Quality	Inadequate	Poor	2
Visibility	Inadequate	Poor	2
Water	Exit Glacier Area - adequate Elsewhere - inadequate	Exit Glacier - fair Elsewhere - poor	1
Geology & Soils	Inadequate	Geology - poor Glaciers - fair Soils - poor	1

Good table But what do these mean?

Paleontology	Inadequate	Poor	3
Climate	General - adequate Local - inadequate	Poor	1
Fire	Inadequate	Fair	3
Terrestrial Flora	General - adequate Veg. Map - none Herbarium - adequate	Research - poor Visual - good	1
Unique Terrestrial Flora	Inadequate	Research - poor Visual - fair	2
Aquatic Flora	Upland - inadequate Intertidal - inadequate	Research - poor Visual - fair	2
Unique Aquatic Flora	Upland - inadequate Intertidal - inadequate	Research - poor Visual - poor	2
Terrestrial Fauna	General spp. - inadequate Mt. Goat & eagle - adequate	General - poor Mt. Goat & eagle - fair	1-2
Unique Terrestrial Fauna	General - adequate Marbled Murrelet - inadequate	General - fair Marbled Murrelet poor	2
Aquatic Fauna	Fish - Inadequate Mammals - adequate	Fishery baseline - poor Mammals - fair	1
Unique Aquatic Fauna	General - inadequate Steller Sea Lion - adequate	General - poor Steller Sea Lion - poor	1

C. CULTURAL RESOURCES

1. DESCRIPTION

Archeological Resources:

Archeological sites have been recently discovered along the outer coast giving rare insights to a rich prehistoric record, previously thought to be absent in the area. Historic and prehistoric sites have been documented along the coast as a result of reconnaissance studies conducted by BIA, coastal rangers, and coastal surveys responding to the Exxon Valdez oil spill. These sites include seasonal camps, groups of culturally modified trees, artifact scatters and villages. Much more of the coast remains unexplored, and known sites have not yet been adequately examined. Archeological artifacts have been collected from the field and are curated by the Alaska Regional Office. Artifacts collected by Exxon researchers in response to the 1989 oil spill are temporarily curated at the University of Alaska Fairbanks Museum. Some items have been returned to the park where they are stored in collections cabinets.

Historic Resources:

Historic sites include abandoned and active mine sites, historic cabins, cabin remains, roads and trails. These dot the landscape primarily along the Resurrection River and in the Nuka Bay area. Historic trapper and placer miner cabins exist along the Resurrection River drainage. One site, the Placer Creek cabin, has been reroofed and refurbished in part, but basal logs are rotting and historic artifacts remain unprotected. This structure was determined eligible for the National Register.

Minor amounts of chemicals and abandoned explosives occur on abandoned and existing unpatented lode gold claims in the Nuka Bay district. Only one claim group has an approved plan of operations and has been active in recent years. That plan has lapsed, and another one in the Surprise Bay area has been approved. Care must be taken to protect remnant historic resources on the old claim sites. One of these sites, the Nukalaska Mine by Shelter Cove, was visited in 1983 by the Regional Historian. Detailed site documentation was completed in 1989 and 1991 by the Division of Cultural Resources Mining and Inventory Program. A National Register nomination is currently being prepared for the site.

2. ISSUES

The significance of cultural resources in Kenai Fjords National Park has been undervalued and remains poorly known. To paraphrase the NPS Alaska Regional Director, the greatest threat to resources in the Alaska National Parks is ignorance. These

statements were dramatically illustrated when the oil spill from the Exxon Valdez struck the coast of the park. One previously unknown archeological site was heavily oiled, and others were lightly impacted from oil spill activities. The incidence of vandalism along shores and elsewhere in the park is not known, but individuals have returned collections taken from sites prior to the establishment of the park. In many cases these well-intentioned people were not fully cognizant of federal laws protecting archeological sites. The dearth of site specific historic and prehistoric baseline information prevents deflection and mitigation of adverse impacts.

Visitation in the park is concentrated at Exit Glacier and along the coast. To lesser degrees people visit the Resurrection River area and the Harding Icefield and glaciers. No one lives full time in the park, but seasonal rangers dwell at coastal sites in summer and at Exit Glacier year round. Commercial fishers ply coastal waters and visit shore areas during breaks or poor weather, and a handful of lode miners adhere to their claims. Though development is minimal in the park at the present time, Seward is developing rapidly, including tourism and industrialization. As human visitation increases in the park, information gathering and vigilance must also keep pace to protect fragile cultural resources.

It is suspected that several layers of cultural influence lie largely hidden in the park landscape. Dwelling and camp sites of indigenous peoples, Russian-American and Native trading sites and historic lode mining sites are all known to occur along park shores. Historic trapping and placer prospecting occurred up and down the Resurrection River valley. The valley was suspected to have been a prehistoric overland transportation route as well. Many of the remnants of these sites have deteriorated nearly completely since the weather is harsh and vegetation grows quickly.

Archeological sites are scattered along the coast, generally where hunting and fishing would have been profitable. Seals congregate near tidewater glaciers at certain times of the year making easy targets for skilled hunters, as are sea lions hauled out on rock slabs. Whales migrate through various passages, presenting large food stores for hunters. Salmon choke streams in summer. Locations of camps undoubtedly changed with the seasons and over the centuries in response to changing abundance and distribution of resources, glacial movements, shoreline changes and climate changes. Some archeological sites may have been buried or bulldozed by advancing glaciers. Other sites may have slid into subtidal zones as a result of earthquakes, or washed away in tsunamis and extreme floods.

The indigenous people along this outer coast have been referred to as the Unixkugmiut, but their origins are not known. Nor is

it known which neighboring tribes had the greatest influences over time, the inland Dena'ina, the Kachemak Bay cultures, the Chugach Eskimo or the Koniag from the Kodiak Archipelago. Careful examination of discoveries in the park area could help explain and understand human migrations, interaction, and occupancy along south central Alaska.

Trade beads of Russian and American origin have been discovered at one site, and it is known that the Russian vessel "Phoenix" was built in Resurrection Bay in the 1790s. Other evidence of the fur trade may yet be lurking in old growth forest that fringes the coast.

Ethnographic information is quickly disappearing as local elders pass away. Many older people in the Native villages of English Bay and Port Graham and the town of Seward remember experiences throughout the park area from many decades ago, but their stories will be lost if not recorded.

Historic structures are being destroyed by inclement weather and heavy snowfalls. These structures need to be documented and, where appropriate, renovated before they completely disappear. These include structures at historic lode gold sites in the Nuka Bay District, and trapper/prospector cabins such as the Placer Creek cabin along the Resurrection River valley. The Historic Resources Study is underway and is planned for completion in 1993. A comprehensive List of Classified Structures (LCS) will be undertaken by 1995. Based upon results of the LCS, evaluations and treatment will be recommended.

Reports are still being written about cultural resources along the coast of the park, but some are being held confidential with pending litigation over the oil spill and the sensitivity of the resources. Due to the lack of a comprehensive cultural resource information base, resource preservation and protection measures and management plans are inadequate. Consequently, valuable information continues to be lost.

A more complete listing of issues affecting cultural resources was generated from a state/federal interagency scoping meeting and subsequent discussion.

D. CULTURAL RESOURCE BASELINE INFORMATION

Enabling legislation and planning documents completed at this time do not fully indicate the level of significance of cultural resources in the park. Assessments of historic and pre-historic resources have focused on the Resurrection River corridor, lode mining claim groups in Nuka Bay, and oil-impacted shorelines.

An archeological survey was conducted along the west side of the Resurrection River valley in the park during summer 1983

(Reynolds 1987). One well-known historic cabin received additional documentation and three other cabin sites were documented. No verifiable prehistoric sites were found, but two pits, possibly of Native origin, were located. Backcountry rangers discovered another abandoned trapper cabin site along the east side of Paradise Creek in summer of 1985. NPS-owned subdivision lots by mile 1.1 of the Exit Glacier Road have no visible cultural artifacts other than cut tree stumps.

A handful of historic lode mining remnants exist in the Nuka Bay subdistrict along the coast. These sites are described by Pilgrim (1933) and by Richter (1970). Backcountry rangers have discovered remnants of other cabins in Nuka Bay and Aialik Bay as well. Log stumps and an abandoned dozer exist in Paguna Arm of Two Arm Bay suggesting a salvage logging operation.

Other observations of cultural resources in the park have taken place in recent years. The Bureau of Indian Affairs conducted reconnaissance surveys along the park coast between the Bear Glacier area and Two Arm Bay in summer of 1987 and discovered several historic and prehistoric sites. The most significant find during this effort was a collection of pit houses near the mouth of Northwestern Lagoon. Commercial fishermen in Nuka Bay told rangers about a possible trading site in Aialik Bay and donated various items to the park (Schaaf 1988). This site has not yet been examined, but it may yield important archeological evidence of Native and Russian-American trade.

Native elders in English Bay have reported a village in the Yalik Bay area around the turn of the century numbering about 100 people. The site has not yet been verified. McMahan and Holmes (1987) reported archeological and historical investigations on Nuka Island and the adjacent Kenai Peninsula. House pit sites, culturally modified trees and various artifacts were discovered in several locations along the coast as a result of the Exxon Valdez oil spill (Mobley et al. 1990). Detailed reports on these resources are being held confidential until spill mitigation and spill litigation are completed.

Over 50% of the park's coast has not yet been adequately surveyed or studied by professionals to document cultural resources.

Appendix C lists the documents needed to effectively identify, evaluate and manage cultural resources. Those considered to be of highest priority for completion are:

Outline of Planning Requirements.

Archeological Overview and Assessment

Ethnographic Oral Histories and Life Histories

Historic Base Map

Historic Resource Study (HRS)

List of Classified Structures (LCS)

Historic Structure Report (HSR)

Historic Structure Preservation Guide (HSPG)

E. CULTURAL CONTEXT/THEME

The cultural context provides the framework within which significant resources can be evaluated relative to ethnographic, historic and prehistoric themes, the geographic area and a specific time period.

Themes offer unifying contexts for grouping research of historic and archeological properties and addressing the extent to which those properties demonstrate the past. A thematic framework is not intended to replace individual research designs, questions or general federal research goals. Themes help the NPS identify and pursue research topics that reinforce each other and quantify the "representativeness" of cultural resources by area, region and the nation.

Using the recently revised edition of the proposed thematic framework (U.S. Department of Interior, National Park Service 1987), the following topics appear relevant to known and potential prehistoric, historic and ethnographic resources in and near the park. Additional themes may be identified in the future.

Theme: Cultural Developments: Indigenous American Populations

Subtheme: The Earliest Inhabitants

Topical Facets

The Early Peopling of North America
The Early Peopling of the Pacific
Archaic Adaptations of the Subarctic
Archaic Adaptations of the Northwest Coast
The Big Game Hunters

Subtheme: Post-Archaic and Pre-Contact Developments

Topical Facets

Subarctic Hunters and Gatherers
Northwest Coast Collectors, Hunters, and Fishermen
Post-Archaic Adaptations
Physical Anthropology of the American Eskimo/Aleut

Subtheme: Prehistoric Archeology

Topical Facets

Prehistoric Architecture/Shelter/Housing
Prehistoric Technology
Prehistoric Diet/Health
Prehistoric Economics/Trade
Prehistoric Settlements and Settlement Patterns
Prehistoric Demographics
Prehistoric Cultural Change
Submerged Prehistoric Period Archeological Resources
Major Contributions to the Development of Culture Histories

Subtheme: Ethnohistory of Indigenous American Populations

Topical Facets

Native Adaptations at Contact
Native Adaptations to Subarctic Environments
Establishing Intercultural Relations
Trapping and Fishing for Newcomers
Whaling and other Maritime Activities
Trade Relationships
Varieties of Early Conflict, Conquest, or Accommodation
The New Demographies
Depopulation of Terrain
Captives, Slaves, and Refugees
Changing Settlement Types
Sedentary Villagers
Maritime Trade Centers

Theme: European Colonial Exploration and Settlement

Subtheme: English Exploration and Settlement

Subtheme: Other European Exploration and Settlement

Topical Facet

Russian Exploration, Settlement and Native Interaction

Theme: Political and Military Affairs, 1865-1939

Subtheme: The Republican Era, 1877-1900

Subtheme: The Progressive Era, 1901-1914

Subtheme: The Great Depression and the New Deal, 1929-1941

Theme: World War II

Subtheme: War in the Pacific

Theme: Westward Expansion of the British Colonies and the United States, 1763-1898

Subtheme: British and United States Exploration of the West
Topical Facet
Scientific and Topographic Surveys

Subtheme: The Fur Trade
Topical Facet
Alaska Fur Trade

Subtheme: The Mining Frontier
Topical Facet
Alaskan Gold Rushes

Theme: Business

Subtheme: Extractive or Mining Industries
Topical Facet
Other Metals and Minerals
Fishing and Livestock

Theme: Science

Subtheme: Earth Science
Topical Facet
Physical Geography
Geology
Paleoecology/paleobiogeography

Theme: Architecture

Subtheme: Vernacular Architecture

The themes outlined above represent a reasonable sample of the park's cultural resources. The prehistoric and historic resources of the park are still being discovered. Before the contextual framework can be adequately developed and evaluated, the Archeological Overview and Assessment, Archeological Identification and Evaluation Studies, Historic Resources Study, and Cultural Landscape Report are needed.

III. NATURAL RESOURCES MANAGEMENT PROGRAM

A. NATURAL RESOURCE SERVICEWIDE ISSUES

Servicewide issues were developed from a compilation of issues affecting all units of the National Park System. Servicewide issues, a required component of each NPS resource management plan, provide a framework to categorize and summarize all natural resource management activities.

Present activities and future program needs for Kenai Fjords National Park are based on servicewide natural resource issues as selected by a federal/state interagency issues scoping group:

CODE

N01 Degradation of Park Resources Due to Native Species Overpopulation.

* Yellow jacket populations have exploded in the Exit Glacier visitor area during some summers creating a hazard and management problem.

* In summer 1990 beaver began to dam drainages in the Exit Glacier area and their impoundments threaten the Exit Glacier road in the park. Trees gnawed by beaver became unstable and pose a hazard to the roadway and motorists.

* A spruce bark beetle epidemic has erupted immediately north of the park near the community of Cooper Landing. The Pothole Lake forest fire burned over 8,000 acres a few miles north of the park in summer 1991 as a result of the beetle epidemic and a runaway hunter fire. Forest stands at the north end of the park are subject to beetle infestation and forest fire.

N02 Impacts on Threatened, Endangered, and other Sensitive Animals.

* The Northern (Steller) Sea Lion was classified as a threatened species during summer 1990 due to recent documented severe drops in population. The park is mandated to protect sea lions and their habitat free of disruptive human activity.

* Marine mammals on the list of endangered species that technically do not occur within NPS jurisdiction but may be affected by visitors to the park area are: Humpback Whale, Gray Whale, and Finback Whale.

* The Kenai Peninsula race of the Canadian Lynx has been listed as a category II candidate for threatened and endangered status. Historically they occurred in the Resurrection River valley, but none have been documented there in recent years.

* The Marbled Murrelet has recently been listed as a category II candidate for threatened and endangered status.

* The Bald Eagle and Peale's Peregrine Falcon are sensitive to human activity because they feed at the apex of the food pyramid, but neither is not listed as threatened or endangered. Peregrine falcons are also

preferred worldwide for falconry. The bald eagle is recognized as the national emblem and protected by law.

N03 Impacts to Threatened, Endangered and other Sensitive Plants

The "Pale Poppy", Papaver alboroseum, occurs at the upper end of the Harding Icefield Trail, and it is now listed as a category III candidate for threatened and endangered status. Initially it was listed as a category II candidate until its range was found to be more extensive.

N04 Degradation of Park Resources Due to Non-Native Animals

* The Alaska Department of Fish and Game is considering a proposal to introduce Sitka Blacktail Deer to the southwest part of the Kenai Peninsula for hunters. It is possible that deer could disperse into the park where hunting is not allowed. Deer are not native to the area. Deer have dispersed into the Seward area from introductions to islands in Prince William Sound in the 1920's.

* Feral dogs are known to roam the Resurrection River valley and could pose a threat to moose, ptarmigan and other wildlife in the area. Feral cats have recently become an issue in the town of Seward, but they are not yet known to be a problem far from city limits.

N05 Degradation of Park Resources Due to Non-Native Plants.

A non-native grass (Lolium perrenne) was introduced to the Exit Glacier area in 1987 to control surface ground erosion along the newly graded Exit Glacier Road. This exotic has not been monitored.

N06 Disruption of Native Plant Communities and Accelerated Erosion Due to Past Land Practices.

* Access roads to unpatented mining claims in the Nuka Bay Mining District are causing some erosion problems.

* Natural stream channel morphology is changing in the vicinity of the Exit Glacier Road Bridge abutment. The abutment appears to be causing backwater eddies upstream which inundate plant communities adjacent to the river and reduced flow velocities downstream of the obstruction that cause increased deposition of materials carried by Exit Glacier Creek.

* Subalpine and alpine plant communities are being disrupted along the Harding Icefield Trail as a result of erosion from marked increase in recreational use.

N10 Disruption of Park Resources Due to Mineral Extraction.

Surface and subsurface land development on unpatented lode claims in the Nuka Bay Mining District may affect park wilderness resources and water quality downstream from leaching of natural and human-released chemicals.

N12 Alteration of Natural Flow Regimes.

* The Nuka River Diversion diverts water away from park ecosystems to the Bradley Lake Hydropower Project.

* The Exit Glacier Road Bridge affects flow of the Resurrection River upstream and downstream which may affect erosion and deposition both upstream and downstream.

N14 Visibility Impairment and Biological Damage Caused by Air Pollution.

Air quality may be impaired by increased visitation to the area by cruise ships, other vessels, and the Chugach Corporation sawmill.

N15 Noise, Visual, and Biological Impacts Related to Aircraft Overflights.

Noise from various aircraft such as helicopters and fixed-wing airplanes can create disturbance to visitors and mountain goats at Exit Glacier and marine wildlife along the fjords such as harbor seals and sea lions.

N16 Visual and Biological Impacts of Industrial and Other Near-Park Development on Park Resources.

* Commercial shipping and fishing activities contribute to the deposition on park shores of oil/hazardous waste and floating debris such as netting. These materials create hazards for wildlife.

* Ice harvesting may disrupt wildlife, particularly harbor seals, and aesthetic settings for recreational groups in the fjords.

* Logging on adjacent lands and on Native-selected lands in the park may adversely affect scenic qualities and winter habitat for mountain goats.

* Excessive floating recreational facilities such as cruise ships, tour boats and proposed floating hotel/barges can create visual and biological intrusions along the coast.

N18 Visitor Use Impacts on Backcountry Resources.

* Impacts to vegetation may occur at campsites and access trails along the coastal strand.

* Vegetation impacts are occurring along Exit Glacier trails and the Harding Icefield Trail which may require adoption of Limits to Acceptable Change (LAC).

* Bears may be displaced by campers and sport fishers.

* Sightseeing tours may inadvertently cause disturbance to various wildlife forms: whales, seals, sea lions, mountain goats, bald eagles and seabirds.

* Poaching of wildlife including moose, bear and mountain goats may occur along the coast and the Resurrection River.

N19 Loss of Park Resources Due to Consumptive Practices.

* Hunting and trapping on lands adjacent to park boundaries may reduce populations of species in the park below the level of "natural and healthy".

* Commercial fishing in waters adjacent to park jurisdiction can adversely affect fish and wildlife populations in the park.

* Proposed aquaculture in park streams and lakes could disrupt wild stock genetics and populations.

* Sport fishing in and outside park boundaries can affect fish populations.

* Backcountry users collect and burn dead down, dead standing and sometimes live wood for campfires.

* Cooperation with ADF&G, USFS and USFWS is needed for monitoring and management of fish and wildlife.

N20 Improve Park Specific Data Base.

* Conduct a comprehensive biological inventory.

* Monitor key plant and animal populations as indicators of environmental change or human influence. Continued monitoring will help measure rates of natural recovery or the success of restoration or reclamation efforts.

* Build a geographical information system (GIS) for the park.

* Inventory past human uses with oral histories and library research.

* Monitor climatic and glacial changes.

* Map geology, soils and vegetation.

* Conduct sociological surveys of park visitor/users.

* Locate and catalog into Automated National Catalog System (ANCS) all past biological, paleontological and geological specimens kept in non-NPS institutions throughout the country.

N24 NPS Comments on Management of Adjacent Lands.

* A need exists to develop cooperative agreements with associated Native American groups for coordinated management of natural and cultural resources.

* Participate in the development of the State's Kenai Peninsula Study Plan during the next few years. This plan could identify important recreational sites where other commercial activities such as ice harvesting are not permitted. (Example - Blackstone Bay near Whittier is identified as a prime recreation site in the Prince William Sound Study Plan.)

* Cooperate with ADNR (State Parks) for a new land use plan for Nuka Island and Nuka Passage, lands now in park status. Also work with State Parks on cooperative agreement for assistance with management of Caines Head State Recreation Area.

* Participate in the Coastal Zone Planning process.

* Coordinate with the State regarding educational information on wildlife, particularly bears.

* Change wording in hunting regulations to clarify for hunters areas closed to hunting along the Resurrection River.

B. OVERVIEW OF CURRENT PROGRAM AND NEEDS

1. MANAGEMENT STRATEGIES

The primary goal of the natural resource management program is to maintain natural processes to the greatest extent possible while protecting human life, private property, significant cultural sites, critical wildlife habitat, and endangered species. Established management zones in the park help direct short and

long-term management of natural systems.

The park GMP defines five management zones which recognize biological, physical and cultural resources with varying qualities and sensitivities to human activities. These zones are: Natural Zone, Outstanding Natural Feature Subzone, Park Development Zones, Special Use Zones and Historic Zones. If wilderness acreage is established in the park, human use may be affected in that area. Only certain types and activities are allowed in each zone.

Zoning classifications apply to Park Service management as well as public activities. All future management decisions must comply with this zoning unless the general management plan is revised or amended.

Management within natural zones focuses on conserving natural resources and processes, and on accommodating compatible uses. Photography, hiking, camping, sport fishing, sea kayaking, river running, bird watching and scientific research exemplify appropriate uses. Natural zones cover the majority of the park.

A subset of this zone is the Outstanding Natural Feature Subzone comprised of the Northwestern Lagoon and Fjord area midway along the outer coast. This subzone protects geological and ecological features with outstanding value. Public appreciation will be emphasized and developments will not be allowed in the Northwestern Lagoon area.

The Exit Glacier development zone has been established to allow construction of recreational access, interpretive displays and administrative buildings. A development concept plan for the area was written, and most of the facilities have been constructed. Trails are still being up-graded to accommodate increasing use of the area.

Small development zones have been created in the fjords allowing for the construction of public use cabins and ranger stations. The boundaries of these zones are limited to the actual facilities and their immediate surroundings as needed to enable facility use and maintenance.

Special use zones within the original park boundary accommodate private inholdings and State land selections. The Nuka Passage and Nuka Island areas are now State lands which have been recently added to Kachemak Bay Wilderness State Park. The University of Alaska retained two 25 acre parcels for future development compatible with the state park. A Native allotment occurs in Aialik Bay as does one small private inholding. Three sets of unpatented mining claims exist in the Nuka Bay area.

A small historic zone has been designated around the abandoned

mining properties in the Shelter Cove area of Nuka Bay. The scope of this zone probably needs to be enlarged as historic resources are uncovered and better understood. Prehistoric sites are being discovered which may also warrant special protection as cultural zones.

The park requires a research proposal from federal and state agencies, and private organizations wishing to conduct research in Kenai Fjords National Park. As required by 36 CFR 2.5 a collection permit must be obtained from the park prior to the taking of any research specimens. All specimens taken from the park must bear official NPS labels and be catalogued in the NPS Catalog. Specimens and data derived from consumed specimens must be made available to the public, and reports and publications resulting from research specimens must be filed with the superintendent. The NPS encourages and has supported appropriate studies by recognized educational or scientific institutions, professional personnel of state and federal agencies, and accredited individuals. Researchers are requested to submit research results to the superintendent and to professional journals to inform the scientific community of findings and research potential in and around Kenai Fjords National Park.

Park information and interpretive programs comprise the key link between the resources management program and the public. It is crucial to relay data and information to the interpretive staff so that significant resource management concerns can be communicated to the public. Interpretive programs at park headquarters, Exit Glacier and on cruise ships will greatly assist resources management thrusts by educating visitors about park resources and engendering their appreciation and support. Park staff host a Tour Operator Workshop including other agency representatives with knowledge about area resources. This program multiplies the park's public information and interpretive efforts by educating and training other public informants.

2. CURRENT PROGRAM

The current resource management program involves one full-time person, one subject to furlough person and four summer seasonals (see Appendix 1 - Personnel Chart). Interpretive summer seasonals and volunteers at Exit Glacier assist year round with resource monitoring. The Resource Management Specialist (RMS) develops and directs the resource management program and writes plans and environmental assessments as needed. Park personnel conduct very little actual research, however they cooperate closely with visiting researchers from other institutions or agencies. Park personnel primarily conduct and assist resource inventory and monitoring projects.

The Resources Management Specialist (GS-11) answers directly to the Superintendent and is responsible for these management

programs: natural resources, cultural resources, GIS coordination, NEPA compliance coordination, and Park Oil Spill Science coordination. In addition the RMS serves on the park Safety Committee, serves as the alternate Park Spill Coordinator, issues collection permits and collects investigator annual reports, assists the Chief Ranger with minerals management, assists the Chief Ranger with law enforcement activities and reports, and provides the Superintendent with information pertaining to controversial issues. The RMS supervises one permanent, less-than-full-time Biotechnician, four backcountry coastal rangers/biotechnicians, and two winter volunteers at Exit Glacier. The RMS coordinates with the Chief Ranger and Interpretive Specialist to ensure that these programs are carried out by interpretive staff where needed.

The majority of resource management staff time and project funding addresses natural resource issues and environmental compliance as shown in Programming Charts 1 and 2 (Appendices A and B). Until recently ONPS funds allocated for resource management by the Superintendent were mostly exhausted by program administration. Field work was largely based on "one time only" special project funds or sporadic regional base funds. Special appropriations from regional base funds have funded most survey and research projects. Much of the work had been conducted by volunteers and short-time, but dedicated seasonal employees. Recent base fund increases are changing that pattern of operation. In FY90 the Alaska Region Science Initiative began to provide park base funds for resource management projects.

A primary thrust of the resource management program has been the gathering and collating of baseline data and information. Though this remains a primary focus of the current program, a shift toward long-term monitoring of key natural resources is beginning. Park staff are able to add incrementally to the baseline data base such as the distribution of flora and fauna, but significant leaps forward seem near impossible without the assistance of highly trained and qualified personnel. For example, park staff lack the training and equipment needed to conduct a comprehensive fishery baseline study. Park staff <u>are</u> able to gather the following resource data: daily weather data at occupied stations, daily readings of stream gages during runoff seasons, monthly snow course measurements, periodic measurements of the Exit Glacier terminus position, positions of coastal glaciers with photographs, unusual wildlife observations, annual counts of eagle nest sites and gull colony nests along the coast, vegetation impacts by trails at Exit Glacier, mountain goat behavior and numbers near Exit Glacier, annual aerial mountain goat population trend counts, and visitor use statistics. Visitor use statistics include monitoring of mining activities, commercial groups, and private groups.

Large projects such as seabird and marine mammal surveys and a

visitor services survey require special project funds. Seabird and marine mammal surveys were conducted in summers of 1976 and 1986 as a result of regional base funds in cooperation with U.S. Fish and Wildlife Service. During 1989 and 1990 similar surveys were conducted during spring and summer using response funds for the Exxon Valdez oil spill. Some data on fishery resources, water quality, intertidal ecology, and coastal vegetation were also collected as a result of the oil spill. The extent of oil impact has been mapped and monitored closely by coastal rangers and various emergency-hire oil spill response staff. Regional base funds provided for a visitor use survey in summer 1990, and results were presented in winter 1991.

As a result of the 1990 park base increase, two resource monitoring projects were initiated. Aerial mountain goat trend counts in representative count units were selected, and results are being compared with the use of helicopter and small fixed-wing aircraft. These data have been shared with the Area Biologist with the Alaska Department of Fish & Game. Coastal glacier photograph points were established in summer of 1990 using Loran-C which was recently purchased for the park vessel. Other lesser projects involved cooperation with university researchers to study interstadial trees and glacial deposits in the fjords, and the establishment of transects on the Harding Icefield Trail to monitor impacts and rates of erosion. The latter effort led to the writing of a park trail plan and trail repair-rehabilitation project.

A wildlife observation database has also been created, and all natural history field observations have been entered into a DBASE III+ database. This database can be readily converted to a GIS layer. A print photograph database/label program was also created. Data are added to both databases as it is received thereby keeping the databases current.

Other resource monitoring projects have been initiated, but the data have not yet been compiled and analyzed. Data on impacts to coastal campsites have been collected by seasonal rangers on the coast. Marine debris collection sites have been identified, but amounts have not yet been quantified.

3. PROGRAM NEEDS

As pointed out in the Alaska Region Comprehensive Science Program Proposal (1988), Kenai Fjords National Park is ultimately slated to have three Resource Management Specialists and one Research Scientist. The RMSs would specialize in ecology, hydrology/ glaciology and vegetation/GIS. The primary need at the park has been to increase resource management base funding to provide a foundation on which to build an effective long term program. Special project funds are needed to complete short-term baseline studies.

Long term management program needs mostly involve natural resource monitoring. These include the continued collection of weather and climate data, measurements and photography of glacier conditions, water quality monitoring at high use sites, seabird and marine mammal population surveys, mountain goat population surveys, bald eagle population and nesting surveys, oil spill impact monitoring, collection of visitor use statistics and collection and maintenance of a wildlife observation database. Monitoring of wildlife populations continues to be the highest priority followed by monitoring of weather and glacier conditions.

Short term program needs focus primarily on the completion of baseline inventory of natural resources. Essential baseline inventories needed in the near future are: a fishery baseline study, establishment of a parkwide glacier photo and measurement data base, a plant succession study of naturally denuded areas at Exit Glacier and in the fjords, geologic and soils mapping, vegetation map, a watershed classification and inventory, water quality inventory, an inventory of natural hazard zones (ie. avalanche paths and floodplains), assessment of bear population and habitat needs, formulation of a bear management plan, a wolverine home range study, completion of a campsite/impact inventory, and a completed inventory of marine debris and pollutants along the coast. All of this needs to be tied together with a Geographic Information System (GIS) database.

Fish population assessments and accurate harvest figures for all user groups are needed to monitor changes in size of fish runs and gage human effects on fisheries and dependent wildlife such as bear, otters, bald eagles and others. A comprehensive fishery baseline study would identify heretofore unknown runs and estimate their abundance. This information is in turn needed to prioritize sites for protection if another event like the oil spill occurs.

Recent concerns over global climate change led to an interagency, multi-park conference in Anchorage on research and monitoring of glaciers. Glacial ice covers half of the park which lies in a significant part of the globe with respect to glacial change. The park has initiated a minimal monitoring system for coastal glaciers using horizontal photography from a vessel platform, but aerial photography and mapping of glacial changes are needed to more accurately assess the changes. Detailed studies and maps of Exit Glacier would help managers decide facility placement and enhance interpretive programs at the site about glaciers and climate. The USGS has acquired annual oblique and vertical aerial photographs of Alaska Glaciers for about two decades, but these have not been indexed and analyzed. Other data sets are also available. This project is needed to assess available information and form a solid database.

Though the park area is presently closed to all forms of hunting, indications exist that poaching, boundary hunting and trapping occur which may impact natural wildlife populations and viewing opportunities. Increased surveillance of illegal activities with State and other Federal agents and improved communications with the public through more clearly defined regulations and public notices will help alleviate adverse pressures on wildlife resources. This includes assisting other agencies with apprehension of violators on adjacent lands and waters.

Black bears concentrate along salmon streams and in small bays along the coast and Resurrection River. Bear incidents have occurred along the coast and at Exit Glacier and Seward, leading to shootings of bears. It is suspected that bears in this rugged, steep terrain may have the smallest home ranges of black bears anywhere in the world. A home range study of black bears may shed light on this hypothesis and provide information that would lead to intensive management of park users, such as designated campsites and food storage facilities.

Wolverine have become scarce in the northern part of the Kenai Peninsula, and an emergency closure to the take of this species was instituted. As access and development spread and trapping pressures increase, it is suspected that numbers of this species may decrease. An interagency team of biologists from ADF&G, the USFWS, USFS and NPS has met and created a step-down decision-making plan to manage wolverine with a primary objective to maximize wolverine numbers for trapping and viewing opportunities. This plan initially calls for aerial surveys of wolverine tracks to determine distribution and denning sites and ultimately a radio-tracking program to determine range and demographic factors.

In response to these and other program needs, the following list of project statements is given in approximate priority order.

C. NATURAL RESOURCE PROJECT STATEMENTS

KEFJ-N-101.1	Assess composition, distribution and abundance of fish species in streams and lakes.
KEFJ-N-101.2	Monitor fish populations in key drainages.
KEFJ-N-102.1	Monitor glacial change: terminus positions, areal extent, surface elevations and crevasse patterns.
KEFJ-N-102.2	Research glacier mass balance and rates of movement.
KEFJ-N-102.3	Conduct deep ice-coring project on the Harding Icefield to intersect volcanic ash deposits, measure rates of accumulation, and determine ice depth.
KEFJ-N-102.4	Conduct radio-echo-sounding transect of

	Harding Icefield to measure ice depths to aid computation of local and global ice balance.
KEFJ-N-102.5	Mitigate glacial hazards with trail design, signing, and public education.
KEFJ-N-103.1	Study ecosystem development on naturally disturbed sites, particularly in deglaciated areas.
KEFJ-N-104.1	Conduct sociological surveys of park visitor/users.
KEFJ-N-105.1	Cooperate with interagency wolverine study on Kenai Peninsula, Alaska.
KEFJ-N-106.1	Monitor park wide mountain goat and moose populations.
KEFJ-N-106.2	Monitor mountain goat habitat use and behavior in the Exit Glacier basin.
KEFJ-N-107.1	Monitor bald eagle and other raptor nest sites and populations.
KEFJ-N-107.2	Assist USFWS with research on Peale's peregrine falcon to determine blood types and toxin levels to compare to endangered races.
KEFJ-N-108.1	Monitor seabird and marine mammal populations.
KEFJ-N-109.1	Map park vegetation.
KEFJ-N-110.1	Monitor impacts from human activities to backcountry resources: water quality, vegetation, soils, wildlife-poaching, aircraft use, trash deposition along the coast and oil/hazardous materials deposition.
KEFJ-N-110.2	Develop a backcountry management plan.
KEFJ-N-110.3	Develop a trail management plan.
KEFJ-N-110.4	Restore damaged vegetation and soil along the Harding Icefield trail.
KEFJ-N-111.1	Conduct study of bear home range size and habitat use.
KEFJ-N-111.2	Develop bear management plan.
KEFJ-N-112.1	Inventory and monitor mammal and bird scavengers along the coast.
KEFJ-N-113.1	Conduct interdisciplinary biological inventory of coastal resources.
KEFJ-N-114.1	Conduct physical and chemical inventory of water resources.
KEFJ-N-114.2	Monitor water resource conditions.
KEFJ-N-115.1	Monitor air quality and meteorological conditions.
KEFJ-N-116.1	Gather climatological data and information.
KEFJ-N-117.1	Develop and manage a data base of natural resources.
KEFJ-N-118.1	Develop a GIS capability.
KEFJ-N-119.1	Monitor geological field surveys work and AMRAP program in the park.
KEFJ-N-120.1	Administer the natural and cultural resources programs.

KEFJ-N-101.1 ASSESS COMPOSITION, DISTRIBUTION AND ABUNDANCE OF FISH SPECIES IN STREAMS AND LAKES.

PROBLEM STATEMENT:

Kenai Fjords National Park was established in part to protect the environmental integrity of fjord ecosystems of which anadromous fish provide an integral biological component and linkage to the sea. Knowledge of fish species distribution, abundance and composition in drainages throughout the park is incomplete and inadequate to protect natural resources in the park. This was demonstrated in part by the response to the Exxon Valdez oil spill. Previously unknown salmon runs were discovered and documented in coastal drainages adjacent to shores affected by the oil spill. Commercial fishing for salmon occurs in fjord waters immediately adjacent to the park. New salmon runs are developing in several drainages exposed this century by glacial recession. Impacts to ecosystem functioning from commercial and consumptive activities by humans is not well understood. Substantial reductions in salmon runs could affect populations of marine mammals, black bear and bald eagles, to name just a few. This project addresses the servicewide issues N16, N19, N20 and N24.

The Alaska Department of Fish and Game (ADF&G) monitors escapement and has conducted productivity studies for key commercial fisheries in the park area. Average and maximum run sizes for commercially harvested runs have been made available, but annual data sets and productivity information are not available. In addition, ADF&G has collected fishery harvest statistics for the outer coast of the park, but park managers have no compilation of that data. State area biologists maintain data files and an atlas on anadromous fish as the data is procured, but the approach is not comprehensive, and surveys of many lesser runs have not been conducted. The State actively manages commercial fishing seasons and reports openings and closures to park personnel who help monitor fishing activity. The State also maintains regulatory markers and has recently erected closure signs, with the permission and assistance of the NPS, where runs are establishing in newly created habitat.

The NPS needs to collect available data and information pertaining to park fishery resources and seek to fill information gaps. This in turn will enable managers to make decisions regarding resource protection and priority setting. To illustrate this point, the Cook Inlet Regional Planning Team, an interagency fishery management group headed by the Cook Inlet Aquaculture Association, decided not to establish stock reserves in the area of the park due to "lack of information". Also, biologists scurried to document salmon runs in drainages adjacent

to shores impacted by the Exxon Valdez oil spill.

RECOMMENDED ACTION:

The primary goal is to gather and organize a comprehensive baseline fishery database for the park to enable informed decisions regarding management actions in and near fishery resources. To accomplish this goal, five specific objectives are suggested:

1. Assemble all existing fishery resource data for the park area, and determine drainages lacking fishery assessments.
2. Assess fishery resources in drainages lacking data for species composition, abundance, distribution, and critical spawning and rearing habitat.
3. Combine data sets into a unified data set on fishery resources in the park, and update the ADF&G atlas and data base.
4. Identify drainages containing fish stocks and biological attributes that warrant intensive study and long term monitoring.
5. Make recommendations to the State and CIRPT regarding wild stock reserves.

The NPS Alaska Region Fisheries Biologist, State fisheries biologists and the USFWS Fishery Study Unit will be consulted to obtain existing data and design a fishery assessment program. Field research will be contracted to qualified individuals with the USFWS, a Cooperative Park Study Unit, or other university researcher. Kenai Fjords National Park can provide logistical support with a vessel and Biotechnicians. Personnel will use various standard techniques to assess species composition, distribution and abundance: beach seines, gillnets, minnow traps, hook and line and electro-fishing. A relative population index for salmon will be developed. Critical habitat will be mapped. Simple water quality data may be obtained such as temperature, pH, dissolved solids, conductivity and discharge rates.

After a fishery baseline is established, long term monitoring of the developing fishery is recommended. In particular, drainages in McCarty Fjord that were ice-covered around the turn of the century have developed commercial-sized salmon runs. As ice continues to recede and aquatic habitat develops, new fisheries are appearing on the horizon. This situation provides an ideal situation to study colonization of a drainage by anadromous fish.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)

60,000/1.0	50,000/1.0	30,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources; NRPP.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearance will be conducted wherever access to monitoring stations involves unavoidable and potentially disruptive activity at cultural sites along stream banks and lake sides.

ANILCA: Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-101.2 **DOCUMENT COLONIZATION PROCESS BY AQUATIC INVERTEBRATES AND ANADROMOUS FISH IN FJORD DRAINAGES**

PROBLEM STATEMENT:

Kenai Fjords National Park was established in part to protect the environmental integrity of fjord ecosystems of which aquatic invertebrates and anadromous fish provide an integral biological component and linkage to the sea. Salmon runs have developed and are developing in drainages of McCarty Fjord that have become exposed from glacial recession this century. Two drainages which were deglaciated since 1911, one including Delight Lake and the other Desire Lake, support commercial fishing for sockeye and humpback salmon. A third drainage (unofficially named "Delectable", "Delusion" or "Ecstasy") lies north of Delight and Desire Creeks, and it was deglaciated sometime between 1950 and 1978 (Post 1980c). Glaciers still occupy cirques below the mountain ridges in this drainage basin, but two lakes serve as natural settling ponds for the turbid runoff below the glaciers. Commercial fishermen report catching sockeye salmon in offshore waters adjacent to the outlet from this drainage in years past, but these schools may have been destined for Desire and Delight Creeks a few miles to the south. Fishery biologists did not report seeing adult salmon in this drainage in 1989 during response activities to the Exxon Valdez Oil Spill, but Milner (pers. comm.) reported finding a few anadromous fish fry in the lakes of this drainage during summer 1991. It is essential that this successional process be studied right away, or the opportunity to document aquatic ecosystem development in this part of Alaska will be lost. This project addresses service-wide issues N16, N19, and N20.

Milner (1987) and Milner and Bailey (1989) studied colonization and ecological development of new streams in Glacier Bay National Park, Alaska. They found that the most significant environmental variables for stream development were temperature, flow regime and sedimentation. Chironimidae (Diptera) were the pioneer invertebrates in newly emergent streams. Ephemeroptera and Plectoptera colonized warmer clearwater streams. Anadromous fish established in clearwater streams, but Dolly Varden (Salvelinus malma) were more abundant than coho salmon (Oncorhynchus kisutch) where pool habitat was absent. Densities of juvenile coho salmon were six times greater in streams with lakes compared to those of similar age without lakes. Milner also related these stream developments to ecological succession theories. He postulated that future advancement of salmonid stocks will probably depend on the rate and extent of development of riparian vegetation. The drainages in McCarty Fjord provide an excellent opportunity to test aquatic ecosystem successional theory described by Milner.

Oswood, Milner and Irons (In Press) discuss the effects of climate change on Alaskan freshwater ecosystems. Milner and Oswood (In Press) take this a step farther in a chapter of their book on Alaskan freshwater ecosystems. Here they focus on development rates of macroinvertebrate communities and colonization rates of streams by salmonids. Milner has continued studies in Glacier Bay National Park and he has boot-legged two short sampling seasons at Kenai Fjords National Park to collect valuable data before the opportunity slips past. He is anxious to study aquatic ecosystem development in the Kenai Fjords to develop further and lend credence to theories developed at Glacier Bay.

RECOMMENDED ACTION:

Contract with Milner or others to conduct physio-chemical and biological observations of three streams in McCarty Fjord (Delight, Desire and "Delectable") to document rates of aquatic ecosystem development and to test theories of aquatic ecosystem development. Materials and methods should approximate those of Milner (1987). Physio-chemical parameters examined should include: years since deglaciation, length of streams, altitude range of streams, range of stream widths, range of substrate sizes, average velocity, summer temperature ranges, ranges of pH, ranges of dissolved oxygen, nitrate and nitrite content, phosphorus content and turbidity ranges. The bathymetry of drainage basin lakes should also be measured. Biological observations should include: plant life on substrate, predominant proximal terrestrial vegetation, invertebrate species composition, adult salmonid species composition and abundance, and juvenile salmonid composition and densities.

Park Biological Technicians could lend support for field operations where needed. Summer backcountry employees can conduct assessments of various stream parameters such as length and character of reaches, widths, substrate characteristics, and proximal terrestrial vegetation types. Researchers could concentrate on more technical sampling and assessments of stream properties. Researchers could base operations during the summer season at the existing backcountry ranger station in McCarty Fjord. The park vessel could supply transportation for researchers and equipment to the study area from Seward. The park has a radio repeater at McArthur Pass which services the McCarty Fjord area.

Budget and Staffing:

FY1 ($FTE)	FY2 ($/FTE)	FY3 ($/FTE)
30,000	25,000	15,000

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources (I&M, Global Climate Change)

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearance will be conducted wherever access to monitoring stations involves unavoidable and potentially disruptive activity at cultural sites along stream banks and lake sides.

ANILCA: Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-102.1 MONITOR GLACIAL CHANGE: TERMINUS POSITIONS, AREAL EXTENT, SURFACE ELEVATIONS AND CREVASSE PATTERNS

PROBLEM STATEMENT:

Kenai Fjords National Park was established in part to preserve the scenic integrity of the Harding Icefield, its outflowing glaciers and fjords. About half of the park area is covered by glacial ice and surrounding ecosystems are affected by the presence of this system. Glaciers integrate climatic changes and respond by changing in surface outline, form and rates of movement. If local and global climate changes are real, we expect glaciers to respond in some manner.

Glaciers on the Kenai Peninsula have receded dramatically in the last four decades such that USGS topographic maps of inch to mile scale and aeronautical charts inaccurately portray the extent of glacial ice cover and terminus positions. Additionally, surface elevations and crevasse patterns have changed which could mislead and endanger visitors to the area. Plans to have a concession operator on the Harding Icefield, including ski plane access and over-snow vehicles, further points to the need to monitor glacial changes. This project addresses the servicewide issue N20.

Changes in the Harding Icefield and its outflowing glaciers affect the entire surrounding environment including: weather, geomorphology, fjord ecosystems, soils, vegetation, fish and wildlife. As glaciers recede, more bare ground is exposed which reduces water storage area and contributes to a greater incidence of flooding. Also, as tidewater glaciers recede or advance, the park boundary automatically changes since it is defined as "mean high tide", and total acreage of the park changes.

These glacial changes affect the human environment as well. Some scientists think that the melt of small glaciers (other than Antarctica and Greenland) around the globe have contributed significantly to the rise in sea level over the past century. Glaciers around the Gulf of Alaska have contributed about one third of the global total for sea level rise. They may provide an early warning system for global climate change since they exist much nearer to the melting point than polar glaciers.

Visitation to glaciers in the park has increased dramatically over the last decade. New roads and facilities have enabled visitation at Exit Glacier to increase from less than 1000 people per year to about 50,000 people per year. The terminus position of this glacier changes each year affecting trails, interpretive displays and visitor safety. (One woman was struck and killed by a falling block of ice in 1987.) Tour boat and cruise ship visitation to the area has increased from less than 10,000 visitors per year to about 80,000 visitors per year. Many of

these people visit tidewater glaciers such as Holgate glacier or take flight-seeing tours over the fjords and icefield. About 20,000 people visit the face of Holgate Glacier each year in tour boats.

RECOMMENDED ACTION:

The primary goals are to establish a long-term monitoring system and prepare a pictorial Hydrologic Atlas of the Harding Icefield and its outlet glaciers to show present day conditions and compare it to known past conditions. This atlas could readily be used for interpretation of glacial change to thousands of visitors and as a baseline against which to compare future changes. Information from the project will help guide management decisions regarding visitor facilities, services and safety.

Considering the size of the area involved and the size of park staff, this project should be conducted in cooperation with the U.S. Geological Survey. As a first step, personnel should acquire all existing maps and appropriate remotely sensed images including satellite images, aerial photographs and surface-based photographs. Where necessary, new images should be acquired to fill gaps in present time data sets to enable current maps to be produced. Maps will show areal extent and crevasse patterns of this glacial system. The atlas will include discussions of glacial history in the area and local glacial and climatic trends.

A system will be developed to make more detailed observations and measurements of key glaciers such as Exit Glacier and various tidewater glaciers for long-term monitoring. Measurements would include changes in terminus positions, weather records, snowfall, runoff or calving rates, and rates of surface movement. If feasible, surface elevations will be surveyed using conventional survey techniques or recently developed techniques using helicopter-mounted laser profilers. Copies of all data sets will be maintained at the park and appropriate agencies such as the USGS, National Weather Service and Soil Conservation Service.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
60,000/0.5	50,000/0.5	20,000/0.3

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources (I&M, Global Climate Change)

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearances will be conducted at any study sites that might involve cultural sites, however, it is not expected that many cultural sites exist near present day glacier positions.

ANILCA: Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park. Subsistence activities may occur in adjacent fjord waters.

KEFJ-N-102.2 MONITOR CHANGES IN THE TERMINUS POSITION OF EXIT GLACIER USING CONVENTIONAL SURVEY TECHNIQUES

PROBLEM STATEMENT:

Kenai Fjords National Park was established in part to preserve the scenic integrity of the Harding Icefield, its outflowing glaciers and fjords. Exit Glacier is the only glacier in the park that is road and trail accessible. Visitation to the glacier has increased from less than 1,000 people per year in 1982 to about 50,000 people per year in 1992. The terminus position of the glacier fluctuates each year affecting trails, signs, interpretive displays and visitor safety. (One woman was struck and killed by a falling block of ice in 1987.) This project addresses service-wide issue N20.

Glaciers on the Kenai Peninsula have receded dramatically in the last four decades such that USGS topographical maps of inch to mile scale inaccurately portray the extent of glacial ice cover and terminus positions. Exit Glacier is no exception to that trend. It has receded about one kilometer since 1950 (Sloan 1985 and Rice 1987). In more recent years the terminus position of the glacier advanced in winter and receded in summer. Seasonal interpreters in summer and winter volunteers have made intermittent measurements from three stakes driven into the ground to the ice edge along predetermined bearings. During a couple of the last five winters the ice front advanced to the extent that trails and trail signs were demolished. The trail has since been designed so that it can be readily rerouted, and signs are fixed so that they may be removed prior to ice advance.

Glaciers are thought to respond to global and local climate changes. Also, as glaciers recede and barren ground is exposed, it has been hypothesized that the potential for flooding increases since more unprotected sediment is exposed to high precipitation events. Seasonal park interpreters and winter volunteers have recorded daily weather observations and stream gage measurements near Exit Glacier. All of these observations are reported to the National Weather Service and entered into a national database. Winter employees make monthly measurements of the Exit Glacier snow survey course, and these observations are reported to the Soil Conservation Service. The SCS publishes that data monthly during winter months. As global and regional climate change continues, it is suspected that glaciers will respond accordingly, including Exit Glacier. As discussed in recent workshops regarding glacier monitoring proposals, Exit Glacier provides one of the most accessible ice fronts in Alaska to monitor for response to climate change and terminus dynamics.

RECOMMENDED ACTION:

Institutionalize a program where resource management staff make

regular periodic (biweekly) measurements of the terminus outline of Exit Glacier using transit and stadia rod to monitor terminus position changes. (The park recently obtained a transit level and stadia rod for trail projects and resource management needs.) These measurements may be increased to once a week during critical turn-around periods in late May and early October. Enter the data into a park computer data base and mapping file. Produce periodic data files and maps showing changes in the terminus position of Exit Glacier. Use the data to plan repositioning of trails and signs in the Exit Glacier visitor use area. Share the data with interpreters and visiting scientists for public information and analysis.

The existing survey markers have been backed up with three additional survey markers in the event the ice front should advance and destroy the closer markers. These survey markers and the existing profile stream gage marker should be connected by accurate survey methods to the Alaska survey net with existing bench marks near the end of the Exit Glacier Road. NPS Alaska Region surveyors in the maintenance division and minerals and mining divisions are interested in assisting with this project and have geodimeters and other long-distance survey equipment for completing such a task. Funding is needed for their travel and per diem.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
20,000/0.5	10,000/0.25	10,000/0.25

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources (I&M, Global Climate Change)

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearances will be conducted at any study sites that might involve cultural sites, however, it is not expected that many cultural sites exist near present day glacier positions.

ANILCA: Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park. Subsistence activities may occur in adjacent fjord waters.

KEFJ-N-103.1 **STUDY ECOSYSTEM DEVELOPMENT ON NATURALLY DISTURBED SITES, PARTICULARLY DEGLACIATED AREAS**

PROBLEM STATEMENT:

Vegetation patterns are changing rapidly following glacial recession of various glaciers in the park during the last century. Primary examples of this exist at Exit Glacier, Northwestern Fjord and McCarty Fjord. Plant succession sequences are not well documented in the park, and they are suspected to differ from chronosequences in other deglaciated areas in Alaska. Failure to document ecosystem development will soon result in the loss of an ideal opportunity to understand basic ecological processes in this unusual, dynamic area. Study results could shed light on natural time-frames required for soils and vegetation to recover on naturally or human-induced disturbed sites.

Visitation to the Exit Glacier area has increased dramatically from about 10,000 visitors a year to about 40,000 visitors a year since completion of the Exit Glacier Road and bridge over the Resurrection River in 1987. Visitors frequently ask questions about the glacial environment. Increased visitation is beginning to show impacts to vegetation and soils immediately adjacent to the glacier. Park managers need information on plant and soil development to evaluate the placement of public viewing sites and facilities in high use areas such as Exit Glacier.

The park is mandated in part to maintain unimpaired and free of disruptive human activity the scenic and environmental integrity of the glacier system and its immediate environment. ANILCA also directs the NPS to preserve wilderness resource values and related recreational and research opportunities of which dynamic ecosystems provide an integral part.

Various related studies have been initiated in the park, but none are yet completed. A dendrochronological study of tree growth on glacial moraines below Exit Glacier was initiated by the NPS regional plant ecologist and documents minimum dates for occupation of the valley by Exit Glacier. The project was started in 1981, but the researcher has become overwhelmed by more pressing priorities, so the data sets and final report are not yet complete. Transects of trails and roads in the Exit Glacier area have been established by seasonal resource management staff, but this data merely documents human impacts in the vicinity of access routes and does not establish a vegetational chronosequence for the area. Glacial geologists have sampled interstadial trees in the fjords to help document forest occupation of these areas prior to glacial advance in neoglacial times. Again, these studies do not explain current processes of ecosystem development in the park.

RECOMMENDED ACTION:

The primary goal is to document ecosystem development on deglaciated areas in Kenai Fjords National Park. Specific objectives to be accomplished primarily at Exit Glacier but also in Northwestern Fjord and McCarty Fjord are:

1) Describe vegetation and soil succession following glacial retreat;

2) Identify and describe successional processes, including colonization;

3) Map and describe vegetation in the Exit Glacier basin, and McCarty Fjord and Northwestern Fjord if time permits;

4) Relate vegetation changes to wildlife food and cover;

5) Document actual succession, rather than hypothesize from existing age structure (establish photographic record);

6) Provide information to managers to plan or modify development in face of changing vegetation.

To accomplish this project the NPS needs to either contract services with a research ecologist with the University of Alaska or other accredited university or hire a research ecologist under the Alaska National Parks Science Initiative.

Some recommended methods to accomplish the above objectives include, but are not limited to:

1) Sample vegetation using points along 20 meter to 30 meter long transects where vegetation is greater than 5%. Set up permanent transects which can be repeated in the future. Compute cover estimates and means.

2) Compute density of woody vegetation with belt transects. Determine crown height, dbh, age and dominance in woody stands.

3) Dig soil pits and describe using standard soil techniques.

4) Mark transect sites on aerial photographs and on the ground.

5) Collect voucher specimens where needed.

6) Identify and describe successional processes, including

colonization.

7) Use available aerial photography to map vegetation in the Exit Glacier area.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
15,000/0.25	15,000/0.25	10,000/0.2

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearances will be conducted at any study sites that might involve cultural sites, particularly where soil test pits might be excavated.

ANILCA: Section 810 evaluation will be completed, but presently no subsistence activities are allowed in Kenai Fjords National Park.

KEFJ-N-104.1 COOPERATE WITH INTERAGENCY WOLVERINE STUDY KENAI PENINSULA, ALASKA

PROBLEM STATEMENT:

ANILCA directs the NPS to provide for the maintenance of habitat and sound populations of wildlife. It also directs the NPS to preserve wilderness resource values. Wolverine are being considered as a primary indicator species of wilderness quality by the U.S. Forest Service and others. Though not a very common species on the Kenai Peninsula, wolverine seem to be relatively abundant in the mountains in and around Kenai Fjords National Park. Rangers and visitors have documented observations of wolverine along the outer coast of the park and along the Resurrection River corridor almost every year. Tracks have also been observed traversing the Harding Icefield and adjacent glaciers. In recent years there has been some concern that wolverine populations have been decreasing in areas outside the park which may lead to a decrease in the park population. This project addresses the servicewide issues N02, N19, N20 and N24.

Wolverine are trapped throughout the Kenai Peninsula, except in the park. Trappers use the road network, snowmachines and aircraft to access their trapping areas. Generally more males are captured than females, but in winter of 1990 one trapper in the Fox River country of the Kenai NWR caught eight wolverine, only one of which was a male. Only one of the seven females was pregnant. If this trend continues, wolverine populations will suffer on the Kenai Peninsula. Fox River is a short way over the mountains from Kenai Fjords NP, a distance thought to be easily travelled by wolverine.

The Alaska Department of Fish and Game and the Kenai National Wildlife Refuge decided to close Game Management Unit 15A to the take of wolverine because of the dearth of animals. It is not known if this area has always had a low density of wolverine, or if trapping pressures have diminished the population. After two years, the USFWS has not located any wolverine or tracks in unit 15A, nor have they been able to capture and radio collar any wolverine in adjacent areas to monitor movements where they are known to occur. The USFWS and ADF&G then decided to expand the scope of their study of wolverine to areas managed by Chugach NF and Kenai Fjords NP. An interagency team of resource managers convened to develop a step-down model for decision-making regarding the wolverine issue. A primary goal was developed which calls for the maintenance of optimum viable populations of wolverine to maximize trapper success and viewing opportunities by area visitors.

Managers want to know where healthy populations of wolverine occur and whether they have refugia and critical habitat on the

Kenai Peninsula that may require special protection. Managers also want to know how far wolverine move and the sizes of their home ranges. The primary methods to achieve these objectives involve aerial surveys and track intercepts during winter after a fresh snowfall, and radio-collaring and aerial tracking throughout the year.

Chugach NF will commit a couple thousand dollars to conduct aerial surveillance and track intercept work in the vicinity of the Resurrection and Russian rivers. Kenai NWR has aircraft with which to survey its lands and will provide barrel traps and radio collars for captured animals. ADF&G will provide skilled biologists and program guidance. The NPS has been requested to provide assistance with aerial surveillance and aerial tracking over its lands. The NPS also offered to monitor trapping efforts near Exit Glacier. Wolverine have been attracted there by mountains goats killed in snow avalanches and moose that die in deep snows.

RECOMMENDED ACTION:

As a first step, aerial surveys of wolverine tracks in the park should be conducted in mid-winter to determine relative abundance and location of population refugia. The work will be contracted to an experienced operator with an OAS-certified aircraft on skis with a biologist skilled in wolverine track identification. About 400 miles of coastline forms the southeast boundary of Kenai Fjords National Park, and another fifty miles of mountain valley occurs along the northeast boundary. At least two sweeps should be flown during ideal conditions in winter, one sweep along the coast near sea level and valley bottoms to assess wolverine activity along the coast in winter, and one sweep at mid-elevations to intercept tracks that frequently skirt avalanche paths. Data will be entered on maps of at least inch to mile scale.

Secondly, a second aerial survey should be conducted in March to identify wolverine denning sites and areas of abundance following the trapping season and prior to black bear emergence.

Thirdly, a feasibility study of trapping wolverine will be conducted in the Exit Glacier area. If it proves feasible to trap and radio-collar wolverine in this area, future plans to do so and radio-track wolverine in the area will be developed. Costs for FY2 and FY3 are predicated on a successful trapping and aerial tracking program.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
5,000/0.2	10,000/0.5	10,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearance will be conducted wherever access to trapping sites may involve potentially disruptive activity at cultural sites along the Resurrection River or the outer coast.

ANILCA: Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-105.1 MONITOR MOUNTAIN GOAT AND MOOSE POPULATIONS

PROBLEM STATEMENT:

As glaciers recede and new habitat for foraging animals such as mountain goats and moose develop, it is suspected that populations will expand. Hunting of moose and goats in what is now the park was minimal prior to park establishment according to ADF&G records. Parkwide aerial surveys for goats were flown in 1981 (Singer and Lovaas 1981) and 1985 (Adams 1985). Results from these surveys show a marked increase in count, but greater survey time and a different time period may largely account for the variance. These data can be compared to findings in hunted areas outside the park to assess the effects of climate, habitat change (including snow accumulation) and hunting on mountain goat populations.

Development of the Exit Glacier area has led to a marked increase in human visitation and the potential for disturbance to goats and moose. The park initiated a goat activity budget study a couple of years ago and continued it to the present. The purpose is to observe goat behavior in the vicinity of Exit Glacier all year long and to assess changes in habitat selection and use which may or may not be attributed to human activity.

Moose are known to occur along the Nuka River, around the West Arm of Nuka Bay and along the Resurrection River valley, but moose populations have not been assessed in the park. Moose numbers have been observed from the air on the park side of the Resurrection River during hunting season. The park is closed to hunting, including subsistence, but some poaching of moose and goats are suspected. Hunting in areas adjacent to the park may remove a few animals that normally frequent habitat in the park, particularly moose in the Resurrection River drainage. Access to hunting areas in the Resurrection River valley have improved in recent years as a result of up-grading of the Exit Glacier Road. Moose populations, however, will probably remain healthy and natural to a large degree.

The primary difficulty in monitoring goat populations in Kenai Fjords National Park involves the steepness of terrain and the availability of cover. It is difficult to obtain reliable counts of animals in this habitat. Nichols (1980) compared counts from fixed-wing aircraft to those made from the ground or helicopter on the Kenai Peninsula, but he later learned from radio-collar studies that goat movements during summer may have drastically affected those counts. He concludes now that more study is needed to adequately compare counts from fixed-wing and helicopter. Nichols (pers. comm.) suspects that goats hear helicopters sooner than a small fixed-wing aircraft, and the goats reach cover before they can be seen from helicopters more

often than from fixed-wing aircraft. Rice and Adams (1990) compared counts of goats from a helicopter and Super Cub in discrete count units of Kenai Fjords National Park and obtained a higher total count of goats from the fixed-wing, but a greater ability to differentiate age classes from the helicopter. So far it appears that each count method has its advantages, but the sample size is far too small to make conclusions at this time.

The major concern and interest is to monitor goat and moose populations over the long term as indicators of change in climate and habitat. This project addresses servicewide issues N18 (Visitor Use Impacts on Backcountry Resources), N19 (Loss of Park Resources Due to Consumptive Practices) and N20 (Improve Park Specific Data Base).

RECOMMENDED ACTION:

Continue to monitor goat populations using trend count unit areas annually and assess the entire park goat population once every five to ten years. Monitor moose populations during hunting season in the Resurrection River drainage. Use aircraft for both species.

The primary objectives in monitoring mountain goats are to:

1) Estimate the abundance and distribution of goats in different count units of the park annually.

2) Determine the age structure of goat populations in discrete count units.

3) Assess count accuracy and reliability using replicate counts by fixed-wing and helicopter.

4) Determine the parkwide population of mountain goats once every five to ten years.

5) Summarize these data annually and circulate to biologists at the NPS Alaska Regional Office and ADF&G.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
12,000/0.5	12,000/0.5	25,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-105.2 CONDUCT MOUNTAIN GOAT HABITAT USE AND ACTIVITY BUDGET STUDY AT EXIT GLACIER

PROBLEM STATEMENT:

Mountain goats (Oreamnos americanus) inhabit the steep terrain north of Exit Glacier and the developed area. As the glacier changes in response to climate change, mountain goat habitat changes. Also, development of the Exit Glacier area has led to a marked increase in human visitation and the potential for disturbance to mountain goats. This project addresses service-wide issues N15, N18 and N20.

Mountain goat habitat in the vicinity of Exit Glacier has changed considerably in the last two centuries and continues to change presently. Exit Glacier has receded about 3 kilometers (2 miles) since 1780 (Ahlstrand 1983 and Sloan 1985), and primary plant succession is still in progress leading to vegetational changes in the area (Ahlstrand 1983 and Helms, in progress). A population of about 20 mountain goats inhabit the steep ridge north of Exit Glacier and the developed area. As snows recede in spring and summer, the goats ascend to the alpine zone. As winter season snows deepen, they descend to old growth spruce stands at lower elevations. During fall the goats breed in this area, and during spring they bear young here.

Since establishment of the park in 1980, visitation to the Exit Glacier area has increased from less than 1000 people per year to over 50,000 people in 1991. Most of this increase occurred after opening of the Exit Glacier Road and the vehicle bridge over the Resurrection River. Construction of the Harding Icefield Trail has led to marked increase in visitation to the alpine zone during summer when it is occupied by mountain goats. Winter visitation by snowmachiners, dogmushers, and skiers has also increased markedly in recent years. Visitors enjoy watching the goats from the road and trails. In some instances photographers venture close, and on occasion goats are disturbed.

The park initiated a mountain goat activity budget study in fall of 1988 with winter volunteers. The purpose was to observe goat behavior in the vicinity of Exit Glacier all year long and to assess changes in habitat selection and use which may or may not be affected by human activity. The Exxon Valdez Oil Spill of March 1989 seriously interrupted this effort, and summer seasons have become too busy to continue this work without dedicated personnel. The park has gathered a general idea of mountain goat use of habitat and percentage of time spent at various activities such as feeding, resting, walking, breeding, etcetera. There are periods of time when these goats leave the Exit Glacier area entirely, and we do not know where they go or why. Helicopters touring the area from cruise ships were observed to disturb

mountain goats, but this activity has been directed away from the Exit Glacier area. No work has been conducted in the park to assess vegetation used by goats.

Data from mountain goat surveys and studies are shared with area biologists with the Alaska Department of Fish and Game. They use survey data to assess affects of management decisions to hunt mountain goat populations adjacent to the park.

RECOMMENDED ACTION:

Conduct a study of mountain goat habitat use and activity budget at Exit Glacier to assess patterns of use and the potential for human disturbance resulting from increased visitation. This study may be completed by dedicated park staff or as a masters project by a university student. A winter seasonal is documenting observations of mountain goat activity using randomly selected 15-minute increments during daylight hours and a gridded panoramic photograph of area habitat. An individual is needed, however, to continue these observations during summer into the alpine zone since interpreters are too busy with visitors. Vegetation sampling and mapping of the area and closer observations of vegetation selected by mountain goats are needed to more accurately assess mountain goat habitat needs.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
15,000/0.5	15,000/0.5	10,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-106.1 MONITOR BALD EAGLE AND OTHER RAPTOR NEST SITES AND POPULATIONS.

PROBLEM STATEMENT:

Kenai Fjords National Park was created in part to protect "...marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes." Raptors are also protected by the Migratory Bird Treaty Act, and bald eagles (Haliaeetus leucocephalus) are given additional protection by the Bald and Golden Eagle Protection Act. As human activity increases in the Gulf of Alaska including oil transportation, commercial fishing and tourism, logging and other industrial activities on land, the potential for disturbance to nesting bald eagles and Peale's peregrine falcon increases. Several bald eagles were found dead along the coast of the park following the impact of the Exxon Valdez Oil Spill (EVOS) of March 1989. Oil spill response aircraft and ground crews were directed to maintain a distance of at least 1/4 mile from known active eagle nests. Data on effects of EVOS to the peregrine falcon have not yet been released.

The NPS and USFWS cooperated to count eagle numbers and nests incidental to seabird surveys which were conducted in 1976 and 1986. Eagle populations and their nest sites have been documented by coastal park rangers every year after 1986. The USFWS also conducted aerial surveys of eagle nests in 1989 and 1990 to monitor impacts from EVOS. Data collected by NPS rangers and USFWS biologists were combined, and a report was written by Tetreau (1991) which summarizes eagle nesting data. This report shows that occupation of eagle nests along the coast have been declining steadily since 1988. Reasons for this perceived decline are not known. Nesting success could be affected by disturbance from increased visitor use, oil spill response activities, loss of eagles from pollution, decreased availability of food due to commercial fishing or natural fluctuations, or the manner of survey. The report also indicates that several nest sites were observed from aircraft that where missed by earlier surveys based from vessels, but a few nest sites were documented by boat crews that were missed by aircraft. Most of the additional nests documented from aircraft were located far from shore and/or at high elevations.

Nesting sites of Peale's peregrine falcon (Falco peregrinus Pealei) were surveyed around the outer coast of the Kenai Peninsula by Janik and Schempf (1985) which revealed a relatively dense population of this race. Subsequent proposals were submitted to study nesting success and blood typing of this coastal race of peregrine falcon to aid with law enforcement and protection of the endangered races to the north, but this work

was never carried out. This race of peregrine falcon has not been listed as threatened or endangered. Surveys of falcon populations in the park were conducted by Hughes of ADF&G and Richie of Alaska Biological Research in 1989 and 1990 in response to EVOS, but these data are being held confidential pending on-going litigation.

Bald eagle populations and nesting sites are important to monitor for a variety of reasons: 1) the species is protected by law and is recognized as the national symbol; 2) bald eagles feed high on the food pyramid and are considered to be an indicator of numerous environmental conditions that may affect other species; 3) bald eagles are highly visible and easy to locate and count; and, 4) bald eagle nests are large and conspicuous making them relatively easy to document.

This project addresses the following service-wide issues: N02 (impacts to threatened, endangered, and other sensitive animals); N15 (noise, visual and biological impacts related to aircraft overflights); N16 (visual and biological impacts of industrial and other near-park development); N18 (visitor use impacts on backcountry resources); N19 (loss of park resources due to consumptive practices); and N20 (improve park specific data base).

RECOMMENDED ACTION:

The primary goal as stated in ANILCA is to protect raptor breeding habitat and bald eagle and raptor nest sites. The NPS will continue to monitor occupation of bald eagle nest sites and attempt to determine rates of productivity per unit length of coastline. Aircraft will be used to survey initial occupation of nests in mid-May and to conduct productivity surveys of occupied nests in mid-July. Biological technicians will continue to monitor eagle and human activity near nest sites, and they will mark the base of nest trees in an unobtrusive manner.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
15,000/0.5	15,000/0.5	15,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined

from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-107.1 MONITOR SEABIRD AND MARINE MAMMAL POPULATIONS

PROBLEM STATEMENT

ANILCA created Kenai Fjords National Park in part to protect "...seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes." Examples of human activity which may be disruptive to these wildlife groups are: development of private lands, commercial fishing, tanker traffic, shipping of toxic materials, mineral extraction, ice collection, increased visitation to areas of important habitat, increases in noise and harassment, and increases in human commensals such as gulls. A prime example of human activity causing severe disruption to wildlife in the park and adjacent areas was presented by the Exxon Valdez Oil Spill (EVOS) of 1989.

In order to assess impacts from human activities, there is a need to understand natural cyclic trends of selected species so cause and effect relationships can be established (Nishimoto and Rice 1987). Frequent monitoring is needed to detect subtle population fluctuations and trends. Interagency cooperation with the U.S. Fish and Wildlife Service's Alaska Maritime National Wildlife Refuge is essential to obtain a holistic view of the seabird and marine mammal populations in and near the fjords. This project addresses the service-wide issues: N02, N15, N16, N18, N19, N20 and N24.

Wildlife surveys along vast stretches of coast produce imprecise population estimates because attendance patterns by seabirds and marine mammals are extremely variable. Overall surveys such as those conducted by Bailey (1976) and Nishimoto and Rice (1986) provide general information, but should not be used for trend analysis. Significant select colony sites and haulouts should be surveyed annually as well as a few randomly selected shoreline segments to monitor more dispersed species. Replicate wildlife surveys should be conducted under optimum conditions to help reduce variability in attendance patterns. Replicate surveys were conducted in response to EVOS in 1989 and 1990. Murre colonies were surveyed on the Chiswell Islands by Nysewander of the USFWS between 1989 and 1991.

Marine mammal surveys should generally follow techniques developed by Murphy and Hoover (1981) and Calkins and Pitcher (1982) for harbor seals and Steller sea lions, respectively.

Seabird surveys should follow standard techniques developed by the USFWS. In general, colony counts of seabirds should be made on overcast or clear days from a vessel with seas less than four feet. Large format photographs should be taken of Black-legged Kittiwake and murre nesting concentrations, and careful counts of

these conducted later in the office. These should replicate photographs taken in the past. Ideally colony surveys should be conducted in late June when nests sites are established and again in late July/early August to document productivity prior to fledging. Surveys of gull nesting colonies can be conducted on foot, and every nest and egg counted. Surveys of shoreline segments should be conducted from a stable vessel at about 100 meters from shore. At least three persons are required; one must operate the vessel, and the other two observe and record sightings. Where the shoreline becomes too rugged and rocky, an inflatable should be deployed from a larger support vessel.

RECOMMENDED ACTION:

Cooperate with the USFWS to conduct annual photographs of seabird colony nest areas and surveys of a random selection of shoreline segments between Yalik Point and Bear Glacier along the southeast coast of the Kenai Peninsula. Photographs will document populations and numbers of colony cliff nesters such as Black-legged Kittiwakes and murres. Shoreline surveys will be used to track changes in populations of more dispersed seabird species such as Horned Puffins, Pigeon Guillemots, American Black Oystercatchers, brachyrampus murrelets, sea ducks, and cormorants. Where warranted, the USFWS will conduct population surveys of ground nesting seabird species and nocturnal birds such as Tufted Puffins, Rhinoceros Auklets, and storm petrels.

Results will be entered into a database management system such as Dbase III+ and compared to results from similar surveys in 1986 and 1989-90.

Conduct annual counts of Glaucous-winged Gulls on Slate Island and the small island south of Dinglestadt Glacier in McCarty Fjord. These should be conducted around June 15 plus or minus three days during sunny weather before young are hatched. An estimate of the number of adults, numbers of nests, and clutch sizes should be recorded so an approximation of productivity can be calculated.

Conduct annual counts of Harbor Seals in popular haul out areas such as below Aialik Glacier, Northwestern Glacier and McCarty Glacier. Use spotting scopes to observe creatures from a high point on land during peak of haul out periods.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
20,000/0.5	20,000/0.5	20,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-107.2 SURVEY MARBLED MURRELET ACTIVITY AND COASTAL HABITAT RELATIONSHIPS

PROBLEM STATEMENT

ANILCA created Kenai Fjords National Park in part to protect "...marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes." Brachyramphus murrelets are relatively common seabirds that occur along the outer coast of Kenai Fjords National Park. Marbled Murrelets (Brachyramphus marmoratus) outnumber the Kittlitz's Murrelet (B. brevirostris) by about 95 to 5 (Bailey 1976 and Nishimoto and Rice 1987). Hundreds of these diving seabirds were thought to perish in the Exxon Valdez Oil Spill.

The U.S. Fish and Wildlife Service is considering listing the Marbled Murrelet as a threatened species, particularly for the Pacific Northwest and Southeast Alaska where it is thought to nest primarily in old growth forest. Fewer than 50 nest sites are known for this mysterious, nocturnal species world-wide; about half of the nests have been discovered on the limbs of old growth trees in recent years (Quinlan and Hughes 1990, Singer, et al. 1991 and Kuletz pers. comm.), and the other half have been ground nests mostly in alpine terrain (Day et. al. 1983 and Johnston and Carter 1985). A ground nest was discovered in Kenai Fjords National Park on June 29, 1991 by B. Rice and P. Spencer. The Kittlitz's Murrelet is less common than the Marbled Murrelet, but there are fewer threats to its nesting habitat which is thought to be primarily rocky alpine habitat (Day et. al. 1983). Surveys are needed to determine habitat preference by murrelets during the breeding season so that disturbance to murrelets can be minimized over the years. This project addresses service-wide issues N02, N16, and N20.

Native village corporations of Port Graham and English Bay are entitled to select some 76,000 acres of federal land in Kenai Fjords National Park. Most of their preferred selections occur along coastal lands with old growth forest. If these lands are selected and subsequently developed or logged, murrelets will suffer a similar fate facing those in more southerly latitudes. Although Bailey (1976) observed almost 3,000 Marbled Murrelets and 162 Kittlitz's Murrelets between Gore Point and Cape Resurrection along the southeast coast of the Kenai Peninsula, and Nishimoto and Rice (1986) observed a few more than 1,500 Marbled Murrelets and 86 Kittlitz's Murrelets, only four nest sites of Brachyramphus murrelets have been discovered in the area. All of these were ground nests.

A pilot Brachyramphus dawn survey was conducted by seasonal Biological Technicians during summer 1991 in Aialik Bay and

McCarty Fjord. Methods generally followed Paton et al. (1990) but were modified for the coastal marine environment. A total of 222 detections were made in 650 minutes of observation time. In general the detection rate of murrelets was much lower by coastal habitat that has been recently disturbed. The detection rate in McCarty Fjord adjacent to recently deglaciated sites was 0.8 murrelets per 10 minute interval. Adjacent to old growth forest habitat in McCarty Fjord the detection rate was 7.2 murrelets per 10 minute interval. In Aialik Bay the overall detection rate was 4.7 murrelets per 10 minute interval with a high of 7.3 murrelets per 10 minute interval adjacent to undisturbed alpine tundra habitat. These surveys must be redesigned to more equitably sample detection rates of murrelets at different habitat types. Also surveys need to be conducted more frequently to determine periods of peak nesting activity.

RECOMMENDED ACTION:

Consult with the U.S. Fish and Wildlife Service and the U.S. Forest Service to design a sampling scheme for Brachyramphus murrelets along the outer coast of Kenai Fjords National Park. Conduct carefully designed dawn surveys to determine habitat preference by murrelets during the breeding season. Train and direct seasonal coastal employees to conduct these surveys from inflatable boats. Monitor murrelet numbers and dawn detection rates where habitat changes or major disturbances such as an oil spill occur in the future. Share findings with USFWS biologists and others at the Pacific Seabird Conferences.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
10,000/0.5	10,000/0.5	6,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

PROBLEM STATEMENT

Though about 50 % of the park area lies beneath glacier ice, a varied mosaic of vegetation covers the remaining surface area of the park. Vegetation in the park varies from coastal Sitka spruce/hemlock forest to alpine tundra. Vegetation patterns are rapidly changing in parts of the park as primary plant succession follows the rapid deglaciation of parts of the fjords and glacial valleys. Sitka Spruce/hemlock forest grades into white spruce near the north end of the park. This area faces potential devastating forest fires as the bark beetle epidemic centered near Cooper Landing to the north ravages white spruce stands. The western-most range extent for Western Hemlock occurs on the Kenai Peninsula. One alpine plant species, (Papaver alboroseum), has been considered as a potential threatened species. Little is known about the percent cover of the various vegetation types throughout the park. Impacts to vegetation in the park, particularly white spruce in the northern part of the park and the coastal forest strand and wetlands, may occur in the future as a result of forest fires, mining activities, visitor uses, and various activities following Native land selections. This project addresses service-wide issues N03, N06, N10, N12, N16, N18, N20, and N24.

Maps of wetlands around the coast of Alaska including quadrangles of Kenai Fjords National Park, were field checked by U.S. Fish and Wildlife personnel in 1988. They produced mylar overlays for U.S. Geological Survey maps with scale 1:63,360. The data give no summary of acreages of wetlands in the park. In recent years various organizations have requested information about the acreage of old growth forest. Assessment of critical habitat for various wildlife species such as mountain goat winter ranges and nesting areas for bald eagles or marbled murrelets is not possible without vegetation maps for the areas of concern. As Native land selections draw to a close, the Park Service has little idea what vegetation or critical wildlife habitat for which to lobby since we know very little about the distribution of vegetation. In order to better protect critical wildlife habitat and potentially threatened vegetation forms, a vegetation map of the park is needed.

Since the park is scheduled to be added to the regional Geographic Information System database in 1995, overall vegetation mapping needs should be satisfied at that time. This system will employ scenes from EOSAT Thematic Mapper with pixel resolution of 30 meters. Areas of the park requiring more detailed resolution of vegetation mapping should be mapped using other techniques such as aerial photography and ground surveys. A park area that may require finer resolution is the Exit Glacier

area where additional future developments are imminent, critical winter wildlife habitat exists for mountain goats and moose, plant succession studies are ongoing, and the vegetation is changing rapidly due to glacial retreat during the last two centuries.

RECOMMENDED ACTION:

Obtain aerial photography of the Exit Glacier area with a scale of 1:20,000 including ground control for surveying and photogrammetry. The existing Alaska High Altitude Photography (AHAP) has a scale of 1:65,000 and is insufficient for detailed vegetation mapping. Using stereo pairs of the areas, map vegetation types to the nearest 10 meters using the vegetation classification scheme by Viereck et al. (1986). Field check mapped vegetation types and correct as necessary. Use this data to delineate critical moose habitat, mountain goat habitat and plant succession patterns for the valley below the glacier. This information can be used in turn to edify the public which visits the area by the thousands.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($FTE)
30,000/0.50	10,000/0.5	

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources Servicewide - GIS.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-109.1 MONITOR BACKCOUNTRY RESOURCES FOR IMPACTS FROM HUMAN ACTIVITY

PROBLEM STATEMENT:

As stated in ANILCA, a primary purpose of Kenai Fjords National Park is to "maintain unimpaired the scenic and environmental integrity" of the area and its wildlife resources "in their natural state, free of human activity which is disruptive to their natural processes." Human use of the park has increased dramatically since its establishment in 1980. Backcountry areas of the park include everything other than the Exit Glacier developed area. Backcountry resources which are used by humans who visit the area are fresh water, fish, firewood, camping spaces and hiking routes. Human activities in the backcountry may lead to adverse impacts such as: destruction of displacement of wildlife, water pollution, soil impacts, damage to vegetation, deposition of trash, and spills of fuel or hazardous substances. Noise from aircraft, motor vessels or other motorized equipment may also adversely impact wildlife and visitors to the park who seek tranquility in a relatively motor-free environment. This project addresses service-wide issues: N02, N06, N10, N15, N16, N18, N19, and N20.

A primary example of an event that disrupted natural processes in the park was the Exxon Valdez Oil Spill (EVOS). This event polluted miles of park shores and intertidal habitat, including supratidal zones inside the park boundary. Toxins from EVOS poisoned and killed large numbers of wildlife in and adjacent to the park. The introduction of hundreds of clean-up workers, motor vessels and aircraft contributed to great increases in noise levels which had the potential to disrupt the breeding and feeding activities of whales, harbor seals, Steller sea lions, and seabirds. The event also led to avoidance of the area by many coastal recreationists.

Backcountry rangers and visitors have noted large deposits of marine debris along the coast of the park. Some of this debris contains toxic substances which may be spilled onto the shores if not removed. Netting may entangle wildlife on shore or adjacent to the shores if it refloats. Styrofoam and other particles are scavenged by some animals which may lead to clogging of their gastrointestinal tracts, malnourishment and death. Bears and other scavengers bite almost all plastic and styrofoam items out of curiosity and to test for edible substances. In some cases bears learn to associate food with plastic and other human items which leads to bear/human conflicts.

Poaching of wildlife in the backcountry has been reported by a few informants. Black bear and mountain goats are the primary target species.

Increased human use of the backcountry may lead to water pollution from improper camping techniques, fuel spills and mining activities in a few locations. Water quality exams have been conducted in a couple of streams for toxins below mined areas in Nuka Bay, and two streams have been tested for Coliform counts in the backcountry near ranger stations. No other water quality exams have been conducted elsewhere in freshwater systems in the park.

Sea kayak groups have reported low flying aircraft that drive harbor seals off floating ice blocks, repeatedly. Sea kayakers and other boat operators also approach too close to seals and other wildlife at times, disrupting their natural processes such as giving birth and molting. People must be educated as to when and how to approach wildlife along a coastal marine environment in an unobtrusive way.

In 1988 backcountry rangers gathered some data on backcountry campsites to document conditions of popular sites. This data has been tabulated, but not yet fully analyzed. Backcountry rangers meet with campers when possible and share with them low impact camping techniques if needed. The park has developed a "No Trace Camping and Travel" handout which is distributed to prospective backcountry users at the visitor center, by park employees on the coast, and by a local sea kayak guide and rental business.

RECOMMENDED ACTION:

The primary means to monitor backcountry resources is through the employment of coastal biological technicians or general park rangers. These individuals gather data on visitor use statistics, wildlife populations, campsite conditions, and coastal resource conditions including oil spill impacts and marine debris concentrations. They disseminate information on low impact camping practices and gather information on resource damage and violations. The existing program should be strengthened with a refinement of data gathering strategies and analysis.

Visitor use statistics are being refined annually. Definitions of camping, overnight use, day use, park land use, and park water use need to be refined with regards to numbers reported. Backcountry rangers frequently fail to contact many groups since they have many other collateral duties. Use statistics must also be gathered from transporters such as air taxi operators and charter vessel operators. The park should supply transportation operators with handouts to give to all prospective backcountry users since park personnel often miss contacting these people. This can be accomplished during the annual spring tour operator workshop.

Protocol for wildlife population monitoring also improve

annually. Techniques must be standardized, however, so that data are comparable over the years.

The park has recently drafted a backcountry campsite monitoring manual and developed a database to track the changes. Backcountry personnel must be trained to conduct these surveys periodically, at least once every three to five years. The backcountry has been subdivided into three subzones: the Harding Icefield Trail, the Aialik Bay Ranger Subdistrict and the Nuka Bay Ranger Subdistrict.

Lastly, Kenai Fjords National Park presents ideal locations to monitor marine debris deposition in the Alaska Region. It should be added to the national park marine debris monitoring program which has no representation in Alaska although Alaska contains over half of the entire coast of the U.S. Alaskan shores in the Gulf of Alaska receive tremendous amounts of marine debris from international fisheries. This program should be patterned after the monitoring program at Channel Islands National Park for summer months only.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
30,000/1.0	20,000/0.5	20,000/0.5

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources;

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-109.2 DEVELOP A BACKCOUNTRY MANAGEMENT PLAN

PROBLEM STATEMENT:

As stated in ANILCA, primary purposes of Kenai Fjords National Park are to

> "maintain unimpaired the scenic and environmental integrity" of the area and its wildlife resources "in their natural state, free of human activity which is disruptive to their natural processes"; and, "In a manner consistent with the foregoing, the Secretary is authorized to develop access to the Harding Icefield and to allow use of mechanized equipment on the icefield for recreation."

Only three percent of the park lies in the Exit Glacier development zone, and the remainder of the park is suitable for wilderness designation (NPS Wilderness FEIS 1988) which can be considered as backcountry, regardless of the final wilderness determination. The preferred alternative in the wilderness FEIS recommends 88% of the park be established as wilderness (subject to Native conveyances and transfers) which allows for mechanized equipment on the Harding Icefield. Backcountry use in the park has witnessed a dramatic increase since access has been improved with a road to Exit Glacier and trail to the edge of the Harding Icefield, and greater numbers of tour boat and charter boats from Seward to the coast following establishment of the park. Media releases have attracted sea kayak parties and recreational boaters to the spectacular coast and the vast Harding Icefield.

As numbers of visitors to the backcountry increase, and various proposals are made to gain greater access to this park, it has become apparent that the NPS must plan for the inevitable changes. Impacts to heavily used coastal strand campsites are beginning to appear, and human/bear interactions have resulted in deaths or injury to bears and damage to property in recent years. In some areas the NPS may wish to harden campsites and designate campfire rings or establish fire grates. Pit toilets and food storage facilities may be warranted in exposed high use areas adjacent to anadromous fish streams where bears congregate. The problems are many and varied, and the time has come to develop a backcountry management plan to deal with these impending changes. This project addresses service-wide issues: N06, N18, and N19.

RECOMMENDED ACTION:

Write a backcountry management plan to plot the future course for research and monitoring of human impacts and for development and management scenarios. This plan will include strategies to protect important park natural and cultural resources. For example, backcountry users may be directed away from sensitive

sites for camping such as active eagle nests, bear concentrations, and archeological sites.

Public education should comprise a major component of this plan. Visitors should be sensitized to resource values both before their excursion and while in the backcountry. Visitors will be warned of hazardous conditions such as toxic spills, severe weather and wild fires.

This plan will also outline research needs for backcountry management. This may include a survey of backcountry users. An inventory and subsequent monitoring of backcountry camping sites is warranted.

The plan will also prescribe an action plan to achieve management objectives. It will define needs for any new facilities in the backcountry and a maintenance schedule for existing facilities such as public use cabins.

This plan may address the needs for commercial use activities and concessions operations in the backcountry. The plan will contain an analysis of the necessity and appropriateness of a concession operation. A concession prospectus has been written for a Harding Icefield Tour operation to date.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
6,000		

Funding Sources:

Park Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 7.4, B(10) (Preparation of an internal plan ... preliminary to the process of preparing a specific Service proposal or set of alternatives for decision).

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned with this project and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-109.3 UPDATE THE TRAIL MANAGEMENT PLAN

PROBLEM STATEMENT:

Kenai Fjords National Park was established by ANILCA in part to: "... develop access to the Harding Icefield and to allow use of mechanized equipment on the icefield for recreation." The park's Statement for Management (SFM), Exit Glacier Development Concept Plan (DCP), and General Management Plan (GMP) further stress the need for public access and trails to the Harding Icefield and other parts of the park. The park encompasses about 650,000 acres (including 76,000 acres of Native-selected lands), but there are only about 10 miles of existing trails. Visitation to the park has increased from less than 10,000 visitors a year shortly after establishment in 1980 to over 100,000 visitors a year in 1991. A park trail plan was written and approved (Tetreau 1991), but already the need for an update is becoming apparent. This project addresses service-wide issues N06 and N18.

Public meetings during autumn in Seward regarding winter use in the Exit Glacier area resulted in the identification of several trail routes. One involved clearing the existing Exit Glacier Creek Trail which had fallen into disuse since the completion of the vehicle bridge and road from Resurrection River to the Exit Glacier parking lot. Dog mushers identified another route between Exit Glacier and Paradise Creek which had been used in past winters but had not been brushed clear in key areas. Most importantly the group identified the need for a major winter trail route along the west side of the Resurrection River between Exit Glacier Road and Placer Creek. The existing trail in Chugach National Forest on the east side of the Resurrection River was deemed to be unsafe and virtually impassable in winter.

The proposed Placer Creek trail on the west side of the Resurrection River passes near important natural and cultural resources. Salmon have been observed spawning in small, clearwater streams which feed into the Resurrection River along this route. Moose congregate in willow thickets in the lowlands, and mountain goats descend into old growth forest on the slopes above the valley floor during winter. Brown and black bear have been observed on the slopes west of the valley floor where they are thought to den. Reynolds (1987) identified several historic trapper and gold-mining sites along this part of the river corridor. The trail route must be selected in such a manner to avoid critical fish and wildlife habitat. Opening the trail to winter use only will alleviate adverse impacts to fish and bears, but moose may be adversely impacted. Many cultural artifacts will be buried by snow in winter, but access to the Placer Creek cabin will be enhanced. This structure should be preserved and protected as the only remaining remnant of the historic period.

RECOMMENDED ACTION:

Update the Kenai Fjords National Park Trail Plan including an Environmental Assessment for proposed actions. The proposed winter trail route between Exit Glacier and Placer Creek constitutes a fairly major undertaking and will require environmental review.

Monitor the use of park trails with trail registers, periodic use surveys, and trail transects. Trail transects should be conducted in fall after the summer season to monitor impacts and help identify maintenance and construction needs. This work will be conducted by the park's permanent Biological Technician and a seasonal employee.

Maintain the existing trails in the park, and clear winter access routes where appropriate and environmental impacts can be held to a minimum. This work will be coordinated in the field by the Biological Technician and the Exit Glacier winter seasonal. Actual trail work will be conducted by maintenance workers and volunteer groups such as the Student Conservation Service and the local Iditarod Trail Blazers Association.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
20,000	20,000	15,000

Funding Sources:

Park Base - Natural Resources and recurring and non-recurring trail maintenance funds; Region - Regular Cyclic Maintenance, Repair-Rehabilitation and VIP; and Non-NPS - Volunteer Labor.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 7.4, B(10) (Preparation of an internal plan ... preliminary to the process of preparing a specific Service proposal or set of alternatives for decision).

NHPA: Section 106 clearance will be required for activities resulting from the plan since ground activity is planned and impacts may occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-109.4 RESTORE DAMAGED VEGETATION AND SOIL ALONG THE HARDING ICEFIELD TRAIL

PROBLEM STATEMENT:

The Harding Icefield Trail evolved from an unmarked route used primarily by ski mountaineers to exit the Harding Icefield, to a flagged route, to a steep trail built by volunteer groups and park personnel. The trail has received increased use especially since the completion of a vehicle bridge over the Resurrection River, the Exit Glacier Road and parking lot. Annual visitation to the Exit Glacier area has increased from fewer than 10,000 people in 1984 to over 50,000 in 1991. A trail register at the base of the Harding Icefield Trail indicates that over 5,000 people venture up this trail in summer. In several places the trail traverses very wet, clayey soils or ascends grades that far exceed acceptable angles. This has resulted in widened muddy segments of trail and severe erosion and loss of vegetation in places. Resource management staff established transects to document trail conditions and trends. The problem appears to worsen over time. This project addresses service-wide issues N06 and N18.

The park wrote a repair/rehabilitation proposal for the Harding Icefield trail which was funded for summers 1991 and 1992. The primary goals for this project are to reroute and rebuild the trail around identified problem areas and reduce the grade with switch-backs and steps where needed. Erosion and loss of vegetation may continue on exposed steep slopes, however, if not actively corrected. This project seeks to identify problem areas and repair and revegetate them if necessary.

RECOMMENDED ACTION:

Resource management staff will continue to monitor trail transects for natural rates of revegetation where severe erosion and loss of vegetation has occurred. Identify abandoned trail sections that continue to deteriorate. Develop a plan to halt loss of soil and vegetation. This may involve various forms of cribbing, planting of native plant materials or a combination of both.

Hire a seasonal trail crew of two people to build cribbing and transplant vegetation to restore damaged sections of trail. If the project appears to be larger, contract with Student Conservation Service for a summer work crew. Post these sites as off-limits to foot travel for revegetation purposes.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
5,000	30,000	10,000

Funding Sources:

Park Base - Natural Resources and recurring and non-recurring trail maintenance funds; Region - Repair-Rehabilitation and VIP.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM6 App. 7.4 E(4) stabilization by planting native plant species in disturbed areas.

NHPA: Section 106 clearance has already been conducted for this area preparatory to the 1991-92 Harding Icefield Repair/Rehabilitation project.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-110.1 DEVELOP A BEAR MANAGEMENT PLAN

PROBLEM STATEMENT:

Both black bear (Ursus americanus) and brown bear (Ursus arctos) inhabit areas within Kenai Fjords National Park. The park General Management Plan (GMP) describes general food habits and ranges in the general area for each species, but little else is known about either species in the park. Black bear are by far the most common species of bear. They occur near forested areas all along the coast and along the Resurrection River corridor. Brown bear have been observed along the Resurrection River corridor in the northeast corner of the park and in Beauty Bay at the southwest end of the park. Numerous bear-human interactions have occurred in the park and in adjacent areas during the last decade, and more are expected as human visitation to the area increases. Over 20 case incident records have documented damage to human resources and/or death to bears. In 1986 alone three black bears were shot and killed by visitors in defense of human life and property. The purpose of this action plan will be to resolve bear-human conflict management problems. This project addresses service-wide issues: N18, N19, N20 and N24.

Consultation and coordination with adjacent land managers and the Alaska Department of Fish and Game must take place, particularly with regards to management of bears in the Resurrection River/Exit Glacier area. An Interagency Brown Bear Study Team (IBBST) was established in 1990 including personnel from Chugach National Forest, Kenai National Wildlife Refuge, the Alaska Department of Fish and Game and Kenai Fjords National Park. The goals of this group are to establish an interagency memorandum of agreement for brown bear management and to develop a habitat capability model for brown bears on the Kenai Peninsula. The group focused on brown bear management in the Russian River-Resurrection River area.

RECOMMENDED ACTION:

Write a bear management plan for Kenai Fjords National Park. Examine bear management plans from other national parks and adjacent areas on the Kenai Peninsula prior to formulation of this plan. At a minimum this bear management plan will outline general goals, management policy and specific objectives. General goals will include:

1. Maintain natural processes affecting the distribution, abundance and behavior of black and brown bear populations.

2. Provide for visitor safety by minimizing bear-human conflicts resulting in property damage or injury.

3. Provide opportunities for visitors to understand, observe and appreciate bears in their natural habitat free of human intervention.

Management policy will stress preventative management as a first step to resolve bear-human conflicts. Specific objectives will outline various subsets of the bear management plan such as: public education, removal of unnatural food sources, management actions in response to bear-human interactions, and research and evaluation.

In addition to the bear management plan, maintain a data base on bear-human encounters. In the past unusual bear observations were recorded on Natural History Field Observations, Form 10-257, and bear-human conflicts were described in Case Incident Records, Form 10-343. Due to an increase in bear sightings in the park in 1991 (particularly along the coast), resource management staff developed a bear-human encounter report form and data base. This reporting procedure was modeled after those presented by resource management staff from Katmai NP and Denali NP in the 1991 Resource Management Specialist Workshop. With this type of reporting procedure we hope to differentiate types and numbers of encounters in order to identify problems and trends.

The park Resource Management Specialist will write the Bear Management Plan and the Biological Technician will maintain the bear encounter data base.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
15,000/.25	3,000/.1	3,000/.1

Funding Sources:

Park Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 7.4, B(10) (Preparation of an internal plan ... preliminary to the process of preparing a specific Service proposal or set of alternatives for decision).

NHPA: Section 106 clearance will not be required since ground-breaking activity is not planned and impacts will not occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in

section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-110.2 CONDUCT STUDY OF BEAR HOME RANGE SIZE AND HABITAT USE

PROBLEM STATEMENT:

Both Black Bear (Ursus americanus) and Brown Bear (Ursus arctos) inhabit areas within the park. Black bear are by far the most common species of bear. They occur near forested areas all along the coast and along the Resurrection River corridor. Brown bear have been observed along the Resurrection River corridor in the northeast corner of the park and in Beauty Bay at the southwest end of the park. Both black and brown bear are thought to den along the Resurrection River corridor north of the Exit Glacier visitor use area. Both species of bear have exhibited aggressive behavior toward humans along the Resurrection River corridor, and black bear have been aggressive toward humans in coastal locations. A study of bear home range size and habitat use is needed to identify critical habitat for bears in and near the park so that human activities can be directed away from these areas during appropriate times. This project addresses service-wide issues N18, N19, N20 and N24.

Black bear home range and habitat use studies should be focused in areas by concentrated human use. These should include the Exit Glacier visitor use area, Pederson Lagoon area in Aialik Bay and the Delight Creek area in McCarty Fjord. The Exit Glacier area is the most heavily visited area of the park with over 50,000 visitors recorded in 1991. Black bear have been observed on and adjacent to trails in the area, in the walk-in campground, and at the ranger residences. They have been observed growling at hikers and seeking food at the ranger residence. Precautions have been taken to prevent bears from obtaining human food (bear-proof garbage cans, steel food-storage boxes, and cable between two trees for throw ropes in the campground), but some bears still seek human food. Concern has been expressed that bears in the park may become accustomed to human foods and odors at the Seward dump which lies only seven miles down the same side of the Resurrection River from the Exit Glacier area.

Salmon runs attract black bear and humans to the Delight Creek area and Pederson Lagoon areas along the coast. Bears also feed on coastal vegetation in tidal flats and lowlands in these areas. Three bears were shot and killed in protection of life and property in one season alone by campers at coastal locations. Other aggressive encounters and wounded or killed bears have also been reported in recent years. The seasonal use of habitat and home range sizes are very poorly known for coastal bears in the park. Some of the smallest home ranges and highest densities of black bears in the world have been reported in Prince William Sound to the east (Modaferi, 1982) which is attributed to steep terrain, deep snows and glaciers, and rich coastal strand

habitat. We suspect that home range sizes may be even smaller in Kenai Fjords National Park where terrain and habitat restrictions are even more severe.

The study would help determine critical black bear habitat use patterns and approximate home range sizes. This will help park managers delineate optimum human uses of backcountry and front-country areas to minimize adverse human/bear interactions. Before proceeding with a black bear study in which bears are handled, the NPS must first secure concurrence, and hopefully, cooperation from the Alaska Department of Fish and Game.

RECOMMENDED ACTION:

Conduct a study of black bear home range size and habitat use by season using radio-collaring and tracking techniques. Bears must first be captured and collared and otherwise marked for positive identification. Tracking of bears may be conducted from the ground, but aerial techniques may prove more efficient in backcountry areas. Focus study efforts on the Exit Glacier area and at least one coastal area such as Pederson Lagoon or Delight Creek. Captured bears should be sexed, aged, weighed and measured for length, girth and foot-size. Unusual markings, if any, should also be recorded. Tracking should be conducted at least three times a season (spring, summer and fall) and preferably more frequently. The NPS may wish to cooperate with Chugach National Forest and ADF&G in the Exit Glacier area, and with ADF&G for the coast.

Helicopters may be needed to locate and capture black bears initially, particularly along the coast. It may be possible to locate and anesthetize bears from the ground in the Exit Glacier area. A fixed-wing aircraft fitted with radio-tracking equipment can be used to relocate collared bears. The radio-tracking part of the project should be conducted for at least two seasons so that denning locations and reproductive rates can be ascertained.

Land surface and vegetative types should be identified after heavy use by bears is observed. Vegetation classifications should follow those outlined by Viereck (1986).

It is estimated that the field part of the project would take at least two seasons, and one more year would be needed to write up findings and recommendations. A research scientist (ecologist) should be contracted or hired to direct this project as identified in the NPS Alaska Region Science Initiative.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
100,000/1.0	80,000/1.0	50,000/1.0

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources; Servicewide - NRPP

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-111.1 INVENTORY AND MONITOR MAMMAL AND BIRD SCAVENGERS ALONG THE COAST

PROBLEM STATEMENT:

Opportunistic and omnivorous feeders such as crows and coyotes are consistently overlooked in seabird and other mammal surveys and studies. These species constantly sample available food sources in the environment, feed near the top of the food pyramid, and operate as indicators of the health and well-being of ecosystems. Decreases in their distribution and abundance may indicate decreased availability of food or increased levels of toxins. Increases in their distribution and abundance may indicate increases in available food such as large die-offs of other species, an abundance of prey, or increased offal from human activity. Scavengers were largely overlooked by studies conducted in response to the EXXON Valdez Oil Spill (EVOS), yet they may have been some of the most heavily impacted species. This project addresses service-wide issues: N16 and N20.

Bird scavengers belong primarily to the Corvidae and Laridae families. In the vicinity of Kenai Fjords National Park these include the following species: Common Raven (Corvus corax), Northwestern Crow (Corvus caurinus), Black-billed Magpie (Pica pica), Glaucous-winged Gull (Larus glaucescens), and Herring Gull (Larus argentatus). Ravens and gulls, considered human commensals, frequent human dumps and prey on eggs and young of other birds. An increase in their survivorship due to human activity could lead to the reduction in natural populations of other species.

The primary mammalian scavengers in Kenai Fjords National Park are Coyote (Canis latrans), Wolverine (Gulo gulo), River Otter (Lutra canadensis) and Black Bear (Ursus americanus). All of these species will feed on carrion when it is readily available. Black bear were observed feeding on an oiled sea lion carcass following EVOS.

RECOMMENDED ACTION:

Complete an inventory of avian and mammalian scavengers along the coast. Assess their distribution and abundance and monitor these attributes of their populations. Focus attention on locations where population trends can be monitored such as Glaucous-winged gull colony sites, and beaches for track intercept rates of coastal mammals.

Monitor annual counts of Glaucous-winged Gull colonies at Squab Island in Aialik Bay and the small island south of Dinglestadt Glacier in McCarty Fjord. Census the number of nests, eggs, adults, and carcasses and failed eggs at the colonies. Follow

techniques described by Murphy and Hoover (1981).

Count numbers of corvids in coastal seabird surveys by shoreline segment. Monitor beached carcasses of whales and pinnepeds for numbers of corvids. Attempt to locate and monitor nesting sites of corvids.

Assess distribution and abundance of mammalian scavengers using track intercepts per unit area on select beaches along the coast. Wolverine studies are addressed in project N-105.1. Where possible document denning sites and heavily used corridors, particularly for river otter. Record all observations of these species on Natural History Field Observation cards and enter into the park's natural history data base.

Field work will be conducted by seasonal personnel assigned to the coast. Data management and reports will be written by resource management personnel at park headquarters.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
10,000/0.4	10,000/0.4	10,000/0.4

Funding Sources:

Park Base - Natural Resources

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-112.1 CONDUCT BIOLOGICAL INVENTORY OF COASTAL RESOURCES

PROBLEM STATEMENT:

ANILCA specified that Kenai Fjords National Park be managed in part to:

> maintain unimpaired the scenic and environmental integrity of ... its coastal fjords and islands in their natural state; ... free of human activity which is disruptive to their natural processes.

A biological inventory of coastal resources is needed to assess the natural state of the park along that part of it which is most susceptible to disruption from human activity. This was aptly demonstrated by the impacts to coastal resources from the Exxon Valdez Oil Spill (EVOS). Other threats to coastal resources in addition to oil spills include: hazardous substance spills from shipping traffic, deposition of marine debris, mining, logging and land developments on adjacent lands and inholdings. The lack of a comprehensive biological inventory of the coast prior to EVOS resulted in a mad scramble to acquire information as the spill swept westward due to the Alaska Coastal Current. This project addresses service-wide issues: N02, N06, N10, N16, N20, and N24.

Such an inventory should include, but not be limited to: intertidal flora and fauna, near shore marine fauna and flora which may visit the coast or wash ashore, coastal flora and vegetation types to some elevation or distance from shore, and coastal fauna. Checklists of birds and mammals in Kenai Fjords National Park are available, but they should be updated. Where available, the distribution and abundance of coastal species should be included in this inventory. A large part of the inventory should focus on smaller, less visible biological components in the intertidal and near shore areas which would be most susceptible to human disruption. Examples include Insectivora, Arthropoda, Bryophytes, algae, and non-commercial fish. These smaller biological components of coastal ecosystems often form primary and essential food bases for larger forms.

RECOMMENDED ACTION:

Collect existing data bases which have been developed from studies conducted in response to EVOS, and collate them into one comprehensive data base for Kenai Fjords National Park. Data gaps should be identified for future assessment once this data base is developed. Voucher specimens of species not yet documented in the park should be collected and curated. Larger mammals and birds need not be collected. Collection permits will be issued to cooperating individuals outside the NPS.

The Coastal Resource Specialist in the Regional Office of Oil Spill Coordination will direct this project. Park resource management staff will assist that individual where appropriate.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
50,000/1	50,000/1	50,000/1

Funding Sources:

Park Base - Natural Resources; Regional Base - Oil Spill

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-113.1 INVENTORY PHYSICAL AND CHEMICAL WATER RESOURCES

PROBLEM STATEMENT:

Water is an abundant and central resource at Kenai Fjords National Park, but little is known about its physical and chemical attributes in the park. Information on physical attributes of water resources in the park are needed for a variety of reasons. The Bureau of Land Management has made requests for stream dimensions and customary and traditional use for navigability determinations. Length, widths and flow rates of streams and rivers are also needed for wild and scenic rivers determinations. Acreages of lakes are being subtracted from the area claimed for Native land selections, yet managers do not know how much area this represents. The abutment to the vehicle bridge over the Resurrection River has impeded natural water flows, and sediments are depositing downstream and upstream of the bridge which may cause complications during times of extreme flooding. Glaciers are also considered a physical water resource, but they are addressed in project statements KEFJ-N-102.

Bio-chemical attributes for water resources in the park are also needed to effectively manage the park. Increased use of backcountry water sources by backcountry users leads to potential contamination of water quality. Giardia has been reported on the Kenai Peninsula, but its distribution is not well known. Past and future mining activities in the park may affect water quality downstream of the sites. The Alaska Department of Environmental Conservation has requested supporting data for non-point pollution sources, but the park service lacks data to determine this for Kenai Fjords National Park. Baseline data on water chemistry is also needed for drainages that have been recently deglaciated which may support anadromous fish.

A basic inventory of water resources in the park is needed to address many information requests and problems. This project addresses service-wide issues: N06, N10, N12, N18, N20, and N24.

A brief report on water resources and hydrologic hazards in the Exit Glacier area was produced by Sloan (1985). Regional staff with the minerals management Resource Assessment Branch have investigated water chemistry in a few streams below unpatented mining claims in the Nuka Bay subdistrict. Park seasonals at Exit Glacier monitor stream gages on Exit Glacier and the Resurrection River in cooperation with the National Weather Service for flood forecasting.

RECOMMENDED ACTION:

Objectives

Conduct an inventory of water resources in the park including

physical and chemical parameters. An inventory of physical attributes of water resources should include, but not be limited to: drainage length, sinuosity, grade, depths, widths, flow rates (where feasible), substrate sizes, temperature, conductivity, bank conditions and stream-side vegetation characteristics. Drainages throughout the park will be classified using the Rosgen System. Flood stages will be documented where discernable, primarily using flotsam and erosional patterns to determine the high water mark. This aspect of the water resources inventory will be conducted by seasonal biological technicians (GS-5) with some training. Summer and winter seasonals will continue to monitor stream gages at Exit Glacier Creek and the Resurrection River bridge.

An inventory of chemical attributes of drainages and lakes should be conducted on all major salmon drainages and other bodies of water used extensively by campers. Chemical attributes sampled should include, but not be limited to: pH, turbidity, hardness, dissolved oxygen, chlorides, nitrates and nitrites, sulfates and sulfites, cyanide, and heavy metals such as mercury. Some of this data may be generated from project KEFJ-N-101. Most of this work will be contracted to private researchers or conducted by regional staff associated with minerals and mining.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
50,000	25,000	10,000

why the decreasing funding requirements?
what about long term additional park base.

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources; Servicewide - Water Resources.

NPS I&M.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-113.2 MONITOR WATER RESOURCE CONDITIONS

PROBLEM STATEMENT:

Extreme precipitation events are known to occur in the vicinity of Kenai Fjords National Park and Seward, Alaska. Ellsworth, et. al. (1915) noted, "Resurrection River is a typical glacial stream, wild and unruly in flood...". In October 1986 the Alaska record for 24 hours of precipitation was set in Seward (Nibler 1986). Extensive landslides and surge-release flooding occurred in the vicinity of Seward as a result of the October 1986 precipitation event (Jones and Zenone 1988). For many years the Exit Glacier Road has flooded between August and November. This has the potential to wash out the road and make it impassable to motor vehicles. Visitors could be trapped. The Federal Highway Administration is in the process of upgrading the Exit Glacier Road, and elevating it where it is prone to flooding. Many engineers and local gravel/water experts agree that the Resurrection River bridge near Exit Glacier is too low, and the span is too short. Jones (pers. com.) observed flood waters above the belly of the bridge during the October 1986 flood.

The Resurrection River bridge appears to be altering the natural flow regime of the Resurrection River. The bridge abutment on the park side inhibits water flow beneath the bridge, and causes water to pool on the upstream side where sediments are unloaded. Water from Exit Glacier Creek, which discharges into the Resurrection River immediately downstream from the bridge, drops its sediment load in the form of a delta which further impedes the throughput of waters down the Resurrection River. Part of Exit Glacier Creek has been flowing upstream under the bridge on the park side of Resurrection River and depositing sediments beneath the bridge where it further exacerbates water flow down the river channel. A large precipitation event such as the one described by locals in 1976 or the 1986 event, could lead to damage to the bridge or the Exit Glacier Road.

High discharge from Exit Glacier occurs during hot weather which melts the ice. The glaciers perform as natural water storage systems during precipitation events. Where glaciers have receded, more barren terrain is exposed to high precipitation which contributes to flooding. See project KEFJ-N-102.

Park rangers now take daily stream and river gage measurements of Exit Glacier Creek and the Resurrection River where the bridge crosses it at the park boundary. A stream profile gage is read at Exit Glacier Creek which consists of a tape measurement from a fixed point to the waters edge. A wire gage reading is taken from the bridge over the Resurrection River. These data are reported to the National Weather Service (NWS) each morning. During times of flooding, multiple readings are taken each day.

In addition to monitoring water conditions in the vicinity of Exit Glacier, flow rates on the Nuka River should be monitored below the diversion on the Nuka River for Bradley Lake Hydropower Project. The U.S. Geological Survey monitors a gage at that location and reports readings to the NPS on request. This project addresses service-wide issues: N06, N12, N20 and N24.

RECOMMENDED ACTION:

Continue to monitor stream and river gages near Exit Glacier and report data to the NWS. Request that the NWS survey again stream cross-sections of Exit Glacier to recalibrate flow rates from the profile measurements made at the fixed point. Survey the fixed point into a survey network for the Exit Glacier area. See KEFJ-N-102. Contact the USGS each winter to retrieve data on flow recordings on the Nuka River.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
5,000	5,000	5,000

Funding Sources:

Park Base - Natural Resources.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-114.1 MONITOR WEATHER AND AIR QUALITY

PROBLEM STATEMENT:

Kenai Fjords National Park receives tremendous precipitation and strong winds from storm tracks which generally emanate from the Gulf of Alaska to the south. Proximity to the Pacific Ocean moderates temperatures, however, cold north winds from high pressure systems descend to the coast in winter causing below zero temperatures. Changes in global atmospheric conditions, particularly increases in carbon dioxide, are expected to cause the greatest increases in temperatures in arctic and subarctic areas. Temperature increase may also result in increased precipitation as noted by studies on Wolverine Glacier by Mayo and Trabant (1984).

Air quality in the area may be affected by increased transportation and industrial activity in Alaska, Siberia and the Kenai Peninsula. Examples of industrialization are the Chugach Sawmill in Seward, oil field development by Kenai, and cruise ships in Seward. The park is classified as a Class II Air Quality area.

Average maximum mean temperatures during summer months in the vicinity of the park are in the 50s (°F), and mean winter lows range from 0° to 20° F. The record high and low at Exit Glacier to date have been 81° F and -44° F, respectively. The long-term mean annual precipitation for Seward is 63 inches (160 cm), but this has increased to 69 inches (175 cm) between 1970 and 1985. A large percentage of the precipitation falls in the form of snow. The year round weather data at Exit Glacier are only eight years old, and only summer data are recorded in Aialik Bay and Nuka Bay. A Soil Conservation Service (SCS) snow survey course was established at Exit Glacier in 1988. Extreme amounts of snow fall in the park as indicated by a snow pack of about 10 feet (3 m) at the high tide line in upper Aialik Bay on June 1, 1991. There are no high elevation records gathered from the park.

It is important to gather meteorological and long-term climate data for the park. These data will help scientists to observe climate changes, resource managers to explain changes in wildlife populations and glacier limits, and visitors to decide when and whether to visit the park. This project addresses service-wide issues: N14, N16, and N20.

RECOMMENDED ACTION:

Continue to monitor weather at Exit Glacier year round using standard National Weather Service instruments to measure maximum and minimum temperatures, precipitation, and snow depth. Continue also to measure water content of snow at the Exit

Glacier SCS snow survey course. Continue to monitor relative humidity and 24 hour temperatures at Exit Glacier using the park hygrothermograph. Monitor maximum and minimum temperatures and precipitation during summer months in Aialik Bay and Nuka Bay. Acquire high elevation weather records on the Harding Icefield using a Remote Automated Weather Station (RAWS) or observed data at a future concessionaire camp. Obtain an atmospheric particulate sampler to monitor air quality at Exit Glacier in the future. Continue to cooperate with the NWS for reporting and analysis of data.

This project requires year round staffing at Exit Glacier. At least two park personnel are required to monitor weather at coastal stations during summer months. Individuals conducting these duties will be at least GS-5's conducting a wide variety of resource management projects and interpretive programs.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
13,000/0.2	5,000/0.2	5,000/0.2

Funding Sources:

Park Base - Natural Resources; Service-wide - Air Quality and Global Climate Change.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-115.1 GATHER CLIMATOLOGICAL DATA AND INFORMATION

PROBLEM STATEMENT:

A primary function of Kenai Fjords National Park is to protect the Harding Icefield, its outflowing glaciers and surrounding environment, and to interpret these phenomena to the visiting public. It is impossible to explain the icefield and glaciers without some understanding of the climate regime and climate history of the area. This information has been gathered to a large extent by Follows (1978) and Rice (1987). Mayo and Trabant (1984) attempted to model glacier/weather relationships for Wolverine Glacier. A rigorous analysis of climate data, and climate modelling for the Harding Icefield has not yet been accomplished. It is very difficult to say at this point in time if the Harding Icefield system will expand or shrink in response to climate warming or cooling.

Past climatological conditions can be ascertained by a variety of methods. One effective way is to analyze tree-ring growth on old growth trees in the park. Large Sitka spruce may attain ages of around 400 years in the vicinity of Kenai Fjords National Park. The presence of interstadial trees can be used to document past forested areas in recently deglaciated terrain, possibly indicating warmer periods in the past. Radio-carbon dating and tree rings analysis can be conducted on cross sections of these former lignophytes. Heusser (1960) used radio-carbon dates from peat deposits to describe possible climatic variations over the past 70,000 years. Lake sediment deposits called "varves" are another way to measure past climate fluctuations as done at Skilak Lake by Perkins and Sims (1983).

An analysis of all available climate data for the region around Kenai Fjords National Park is essential to understanding the present environment and to predict climate trends in the area for the future. This project addresses service-wide issue N20.

The bulk of this work should be conducted by visiting researchers and other federal agency staff with the USGS, EPA, and NOAA.

RECOMMENDED ACTION:

Gather all climatological data for the park vicinity into one cohesive body. Cooperate fully with visiting researchers such as Calkins and Wiles with the Department of Geology from the University of New York, Buffalo who have been gathering samples from interstadial trees in the fjords for radio-carbon dating and tree-ring analysis. Gather and analyze tree ring samples from Sitka spruce throughout the park. Use the dendrochronology lab facilities in the Alaska Regional Office to analyze field samples. Use this data to model past climate fluctuations in the

park. Cooperate with university researchers to model climate regimes in the vicinity of the park. These models can also be used to explain archeological sites in the park (see KEFJ-C-202 and KEFJ-C-203).

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
30,000/0.5	30,000/0.5	10,000/0.2

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Science Research; Servicewide - Global Climate Change; Non-NPS - University or College, other Federal Agency.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-116.1 DEVELOP AND MANAGE A DATA BASE OF NATURAL RESOURCES

PROBLEM STATEMENT:

The diversity, complexity and volume of natural resource data for Kenai Fjords National Park and its immediate environment has swelled considerably in the last few years, particularly as a result of the Exxon Valdez Oil Spill (EVOS). Not only are natural resource files at the park growing considerably, but natural resource data collected by visiting researchers have become voluminous. A comprehensive computer data base is needed to track all data sets concerning park natural resources. Detailed data bases are needed at the park level to document and track park natural history observations and other special data sets such as resources by coastal segment, seabird and marine mammal surveys, eagle nests, mountain goat surveys and others. Many coastal data sets developed in response to EVOS were developed on MacIntosh computers which are not all compatible with IBM computers. The park needs to convert all data sets to IBM compatible systems where possible. Databases should be built using DBase and Lotus 123. This project addresses service-wide issues: N02, N16, N18, N19, N20 and N24.

RECOMMENDED ACTION:

Develop a Dbase III+ database of Natural History Observations and update new observations at least once a month. Elicit the participation and cooperation of tour companies in the development of the natural history data base. Share data base with interested groups such as tour companies and outfitters.

Use the Investigator Annual Report system to track research and natural resources information generated from outside and National Park Service sources. Update the data base once a year.

Purchase the latest edition of Lotus 123 and develop data bases to capture information on MacIntosh computers used in response to EVOS.

These data bases will be developed and maintained by a GS-5/7/9 Resource Management Specialist.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
30,000/1.0	30,000/1.0	30,000/1.0

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources Management, Office of Oil Spill Coordination.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-117.1 DEVELOP A GEOGRAPHIC INFORMATION SYSTEM CAPABILITY

PROBLEM STATEMENT:

Effective management of resources in Kenai Fjords National Park requires that large amounts of natural and cultural resource data be viewed with an eye toward numerous overlapping values. These resource values include geologic features, soils, vegetation types, wildlife habitat, archeological sites, historic mining and trapping sites, and special scenic and recreation areas. Special subsets of these values include but are not limited to: tidewater glaciers, the Exit Glacier interpretive area, Sitka spruce and hemlock rainforest, scenic trails, seabird colonies, marine mammal haulouts and pupping grounds, bald eagle nests, salmon spawning streams, critical black bear feeding habitat, mountain goat winter habitat, abandoned Native village sites and abandoned and unpatented gold mining claims. Locations and significance of these various resource values became extremely valuable during response efforts to the Exxon Valdez Oil Spill (EVOS). Huge resource data sets were rapidly developed. Park resource data must be computerized to reduce retrieval time and enable rapid manipulation for various needs. The most effective way to manage these data sets is with a geographic information system. This project will assist with identification and monitoring of service-wide issues: N02, N03, N05, N06, N10, N12, N15, N16, N18, N19, N20 and N24.

New resource layers will develop with the passing of time. Various segments of coast have been impacted by crude oil from EVOS, and these sites are being monitored over several years. Also as a result of EVOS, long-term ecological monitoring sites have been established in intertidal areas of the park. Geologists have discovered locations of interstadial trees in recently deglaciated zones indicating locations of ancient forests prior to glacial advances. Drainage patterns, formation of lakes and other geographical features are changing constantly in this dynamic landscape as a result of climate change, tectonic events and human activity. As a result of these changes, biological succession further modifies the face of the park and ecosystem functioning.

Perhaps one of the greatest benefits of a GIS would be in monitoring and evaluating Native land selections along the coast of the park. Native Village corporations are entitled to about 76,000 acres of coastal lands within legislated park boundaries. Selection priorities have changed at least four times, making tracking of this process complex and complicated. Even after selections are made, complex land management schemes involving the NPS are bound to result.

Kenai Fjords National Park is slated to receive GIS baseline land

cover maps in 1995 from the Alaska Region GIS office. Thematic Mapper images have not yet been acquired for the park due to cloud cover. Digital terrain data are available. In the mean time the park needs to prepare data bases for the upcoming GIS capability and develop a temporary, though less sophisticated, GIS capability.

RECOMMENDED ACTION:

Develop computer data bases of park resources with accurate geographic descriptions such as latitude/longitude or UTM coordinates so that information can be rapidly merged with the GIS capability once it comes on line. Maintain files of resource data with maps showing resource values so that these data can be digitized into the GIS in the future.

Purchase AutoCAD software and appropriate hardware to develop computer generated maps from existing databases which can later be loaded into GRASS/SAGIS or digitized. AutoCAD was successfully used to track crude oil impacts to the park from EVOS, and coastal terrain data are already available from the Alaska Regional Office.

Prior to the use of the NPS GIS program, park users should complete training in the use of GRASS 4.0 (Introduction to GIS and Advanced Grass Applications).

The project will involve:

(1) land cover classification and ground-truthing,
(2) assimilation of digital terrain data,
(3) digitizing and rectification of geographical data,
(4) creation of selected data layers,
(5) report preparation and publication.

Information sources will be identified and resource data gathered. Research will be conducted to select appropriate pixel size for analysis, mapping and modeling. Compatible software will be selected for statistical analysis and graphics.

All NPS and ARO GIS quality assurance standards will be met. Care will be taken to minimize introduction of error by documenting steps used in creating new data layers and files. Accuracy will be emphasized as essential for meaningful resources management and research.

The GIS program will be developed to be flexible and responsive. Methods and techniques used in establishing and manipulating data bases will be documented in a manual. An initial goal of the project will be to generate an accurate land cover map with report. Subsequently significant data layers such as Native lands selections, wilderness boundaries, EVOS impact sites,

critical wildlife habitat, cultural sites, and research sites will be created. Ultimately a work station will be located at the park which will be able to interface with Regional and National GIS systems.

The budget includes salary for a GS-09 GIS applications specialist, acquisition of work station hardware and software, training and travel, and report preparation costs.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
60,000/1.0	40,000/1.0	40,000/1.0

Funding Sources:

Park Base - Natural Resources: Regional Base - Natural Resources Management; Servicewide - Geographic Information System.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-118.1 MONITOR GEOLOGICAL FIELD SURVEYS AND AMRAP PROGRAM IN THE PARK

Problem Statement:

Geologists associated with the U.S. Geological Survey (USGS), with accredited universities and other institutions are showing increased interest in geological field studies in Kenai Fjords National Park as it becomes better known. Since regulations for the Alaska Mineral Resource Assessment Program were recently adopted, geologists with the U.S. Geological Survey have increased their effort to complete geological field assessments in the vicinity of the park. These activities frequently require the use of helicopters for access to remote sampling sites and collection permits for rock samples. There is a dearth of information about the bedrock geology and surficial deposits in the park. Much terrain is exposed since glaciers have receded this century. NPS staff spend considerable time administering these programs and monitoring the use of helicopters in the field. This project addresses servicewide issues N15 and N20.

Geological assessments in the area that is now the park began shortly after the turn of the twentieth century when gold prospectors combed the landscape. Geologists with the USGS (Martin et al. 1915) and mining engineers with the territory of Alaska (Pilgrim 1933) made periodic assessments of the mineral potential in the region. Geologists with the USGS also examined the mineral potential of the Nuka Bay District after World War II (Richter 1970). USGS geologists began surface sampling in the park in 1986 at lode gold sites to better assess mineral potential and regional tectonics. Since that time the USGS identified a need to conduct a more comprehensive assessment of the mineral potential in the Seldovia Quadrangle, Alaska in which lies a large part of Kenai Fjords National Park. Information generated from these studies will complement the park's natural resource data base.

Recommended Action:

Cooperate with the USGS to complete the AMRAP program in Kenai Fjords National Park. This program should be completed by 1993. Cooperate with other geologists associated with credible institutions and agencies to study surficial deposits in the park area. Assure that collection and special use permits are issued and followed in accordance with NPS guidelines.

Budget and Staffing:

FY1 ($FTE)	FY2 ($?FTE)	FY3 ($/FTE)

10,000/0.3	10,000/0.3	7,000/0.2

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources (Mining and Minerals Division)

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-N-119.1 ADMINISTER THE NATURAL & CULTURAL RESOURCES PROGRAMS

Problem Statement:

About 50% of the Chief of Resources Management and 20% of other employees in the Resource Management Division is devoted to administrative functions. This entails maintaining budgets, hiring, supervision, performance appraisals, files management, responding to memorandums from the region and Washington offices, and responding to an increasing number of surveys and technical information requests. Administrative duties have increased dramatically since 1989, the year of the Exxon Valdez Oil Spill. The Resource Management Division was also created subsequent to EVOS, adding to the administrative duties of the Resources Management Specialist. Division staff has increased from one RMS to the Chief of RM, a subject-to furlough Biological Technician, four summer seasonal Biological Technicians, and one winter seasonal Biological Technician. The division is expected to increase by at least two more permanent employees in the next couple of years, a RMS Geologist/Hydrologist and RMS GIS/Vegetation Ecologist. The administrative duties of the Chief of Resources Management is expected to increase incrementally as staffing and information requests increase. This project addresses servicewide issue N24.

Recommended Action:

The Chief of Resources Management must continue with administrative duties. The division will continue to answer requests from the Region and other Divisions and offices in a timely manner. Eventually a division clerk will be needed to tend to filing, routine information requests of the division, and personnel matters such as forms for hiring, travel and training.

Budget and Staffing:

FY1/FTE	FY2/FTE	FY3/FTE
20,000/0.5	20,000/0.5	30,000/1.3

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.7 (Routine and continuing business, including such things as supervision, administration, operations, maintenance and replacement activities having limited context and intensity.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park.

KEFJ-N-120.1 CONDUCT VISITOR USE SURVEY

Problem Statement:

Visitation in Kenai Fjords National Park has increased 1811% in ten years, from 5,649 in 1981 to 107,973 in 1991. Visitor facilities have also changed in a way that attracts greater numbers of visitors. A "Visitor Services Project" was conducted for the park at Seward and Exit Glacier during the summer of 1990 (Littlejohn 1991). This report profiled visitors to the park at that time. The trend of increasing visitation to the park shows no sign of leveling off in the near future. Additional visitor use surveys will be needed periodically to monitor visitor perceptions of the natural resources and opportunity settings provided by the NPS. This project addresses service-wide issues N18, N20 and N24.

As facilities change in response to increasing visitation, even more visitors are attracted. This leads to a phenomenon called "social succession" described by Jubenville (1985). As "improved" access or additional buildings such as cabins and lodges are provided, more people are generally attracted. Former visitors, who often preferred more primitive recreation opportunity settings, either adapt to the changes or are displaced.

Increased backcountry use may lead to impacts to vegetation and wildlife habitat. Vegetation impacts have already been observed along the Harding Icefield Trail leading to a trail rehabilitation project. Bears may also be affected by and affect backcountry users. Backcountry visitors may expect or demand that certain sites be hardened or improved to protect resources and the user.

Visitor surveys help the NPS become aware of visitor perceptions and needs. They also help the managers understand who visits the park and why. To effectively manage the park, periodic visitor surveys are essential.

RECOMMENDED ACTION:

At a park experiencing rapid change such as Kenai Fjords NP, visitor use surveys should be conducted about once every five years. A survey using a format and method similar to that used by Littlejohn (1991) would be valuable for comparison. The project is best carried out by a Cooperative Park Study Unit as before for consistency and ease of comparison with other park units.

Budget and Staffing:

FY1 ($FTE)	FY2 ($/FTE)	FY3 ($FTE)
12,000/0.25	3,000/0.1	

Funding Sources:

Park Base - Natural Resources; Regional Base - Natural Resources.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2, Appendix 2.

NHPA: Section 106 clearance will not be required since no ground-breaking activity in the park is planned and no impacts will occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

IV. CULTURAL RESOURCES MANAGEMENT PROGRAM

A. CULTURAL RESOURCE SERVICEWIDE ISSUES

Present activities and future program needs for Kenai Fjords National Park are based on servicewide cultural resource issues as selected by a federal/state interagency issues scoping group, and further refined by the NPS Regional Cultural Resources Division:

CODE

C01 Inadequate Planning Documents

The Outline of Planning Requirements (OPR) needs to be completed for the park, and the revised Statement for Management needs to be printed. The General Management Plan is current and approved, but it should be updated in 1994 since ten years will have lapsed and the park sustained Exxon Valdez oil spill and changes in management direction.

C02 Inadequate Archeological Survey and Inventory

There has never been a systematic archeological survey of the park's coastline, and very little is known about the area's cultural history. Implications of this void in baseline cultural resource data became clear during resource protection response to the EXXON VALDEZ oil spill. The following documents and actions are needed:

* Prepare an archeological overview and assessment.

* Conduct archeological identification and evaluation studies including:

  completion of documentation of partially recorded sites;

  recovery of sufficient information for evaluation of significance and completion of National Register nominations;

  a systematic shoreline survey (by boat) preceded and guided by comprehensive compilation and paleogeographic information, low altitude aerial photographs and settlement pattern analysis of existing archeological and ethnographic data.

* Develop and implement the Cultural Sites Inventory data base, as specified in NPS-28, to improve effective management of the resources.

C03 Incomplete Cataloguing of Museum Collections (ANCS)

NPS regional office Museum Technicians catalogued the bulk of the backlog of collection items and various objects. The remaining backlog consists primarily of archival materials of past research and park documentation. Park staff has designed and initiated a computerized photograph log and labelling system, but photographs prior to the EXXON VALDEZ oil spill have not been documented. As research in the park increases and collections from the park grow, entries into ANCS must be performed. This will require continued support from the region until adequate park staff is hired. Future research in the park must consider costs to maintain curatorial records.

C04 Need for Ethnographic Overview and Assessments, Oral Histories and Life Histories

* Conduct a socio-cultural study to understand traditional land and resource use, and traditional Native associations in the park area. Valuable informants reside in the local communities of Seward, English Bay and Port Graham. The ADF&G Subsistence Division produced one document regarding subsistence use of resources at English Bay and Port Graham (Stanek 1985). Information from local residents will aid interpretation of archeological and historical sites and Native land and resource use of park land. This study will be consistent with NPS Management Policies (1988).

* Collect oral histories with local area residents to document past land and water use practices, conditions of fish and wildlife populations, and climate change. Information gathered may provide valuable perspectives for global climate research.

C05 Need for Historic Structure Reports (HSR), Condition Assessments

A few historic structures in the park such as the Placer Creek Cabin and buildings in the Nuka Bay Mining District still stand, but they are rapidly deteriorating in face of the elements over time. Historic structure reports are required before historic structure preservation guides can be written and the structures saved.

C07 Inadequate Historic Structure Survey, Condition Assessments and Inventory (LCS)

Several historic cabins and up to 15 mining areas in the park, particularly the Nuka Bay Mining District, remain undocumented. A number of these properties, such as the Placer Creek Cabin and Shelter Cove Mine, are of particular concern. The survey and inventory will include location, complete documentation of site, inventory of associated items, condition evaluation, evaluation of needs, preparation of LCS forms for historic structures, and historic structures reports where required.

C08 Need for Historic Resource Studies (HRS) and Administrative Histories

* Conduct a Historic Resource Study to provide both inventory data and historical context for determining the significance of individual resources. Historic uses of the Seward area have been documented in a few publications, but historic uses in the park area before creation of the park are not well documented in a cohesive work. Much of the data may be acquired from resource management agencies and previous land management agencies such as USFS and BLM. Much useful data can be procured from oral histories, the Resurrection Bay Historical Society and consultation with back issues of local newspapers. The HRS will include historical narrative for the park and surrounding region, historic resources inventory, base map and National Register nominations for eligible sites.

* Produce a park administrative history to cover the recent complex history of land management and the present diversity of legal interests.

C09 Need for Collections Management Plans, Collection Storage Plans, and Collection Condition Surveys

The combined CMP/CSP is being written by the Curatorial Services Division at the Harpers Ferry Center. A CCS of existing collections is needed. When a decision is made about oiled objects that are presently being held as evidence in the Exxon Valdez oil spill court case, those objects may also require a CCS.

C10 Need for Specialized Studies for Unique or Complex Management Issues

* Conduct a field survey and inventory study to address the effects of the oil spill and related activities on coastal cultural properties.

* Conduct a study to identify potential impacts from conveyance of Native land selections which will remove most of the coastal land from the park. Particular attention will be given to identification of cultural properties on selected lands.

* Inventory and evaluate threats from explosives and other hazardous materials in mining areas and recommend treatment.

C11 Need for Cultural Landscape Report

Explore the need for a cultural landscape report for the Nuka Bay Mining District with the Regional Historian. A site management plan may suffice.

C14 Need for Major Archeological Data Recovery

* Conduct archeological documentation and evaluation studies of the Denton Site (Xbl-014), a nineteenth century site located on village-selected land. The purpose would be to identify cultural components and evaluate site significance prior to land conveyance.

* Recover archeological data and evaluate the large village site in Harris Bay which was discovered by BIA. This 16th and 18th century site may provide significant understanding of regional prehistory, specifically Den'aina and southern Eskimo interactions, and the effects of early European contact on local cultures. Conduct testing prior to conveyance of this Native selection.

C15 Need for Conservation Treatment of Museum Objects

Perform conservation treatment on old maps, rusting mining implements, organic and stone artifacts from archeological sites, and historic photographs. Send single objects requiring immediate conservation treatment to the Harper's Ferry Center Conservation Lab with prior approval of the Regional Curator. Closely monitor objects on loan to the park awaiting ownership decisions to assure that their condition remains stable.

C16 Improve Storage and Environmental Controls for Museum Objects

Move natural and cultural materials into a dedicated storage area with adequate environmental control and

controlled access. Insure security for objects and specimens being kept as a result of the oil spill.

C18 Control Visitor Impacts

Patrol coastal areas more frequently as recreational activity increases, particularly at Harris Bay and McArthur Pass, to prevent vandalism and looting of highly visible archeological sites exposed on beaches.

C19 Improve Cultural Resources Monitoring Program

Monitor locations of surface archeological sites and historic resources that are now known to many people as a result of the oil spill-related activities and increased visitor use. Develop a program to apprehend violators of the Archeological Resources Protection Act (ARPA).

C20 Improve Security

Train all incoming personnel to maintain vigilance over sensitive cultural resources including human conduct around curated resources.

C21 Need for Emergency Site Structure Stabilization

Following the HRS and LCS, stabilize as soon as possible the Placer Creek Cabin, the Shelter Cove Historic Mine sites, and any additional sites identified by the studies.

C22 Threats to Cultural Landscapes and Viewsheds from Beyond Park Boundaries

Monitor threats to cultural landscapes and viewsheds from outside the park such as oil spills, logging, ice collection, marine debris, development and other consumptive uses and activities. Monitor changes in public access and viewsheds as a result of Native land selections along the coast.

C24 Insufficient Professional Staff

Increase staffing or rely on NPS Regional Office and other professional personnel to perform required cultural resources inventory and monitoring.

C25 Need for Cultural Resource Management Training

Send park staff to training on ARPA and related incidents, the National Historic Preservation Act

(NHPA) section 106 compliance and training in managing National Register properties.

C26 Need to Develop and Implement Interpretive Programs

Develop interpretive, slide, video and cassette tape programs that address cultural resources and their values in the park and neighboring areas. Invite guest speakers for evening and special gatherings to present programs to the public.

C-- Improve Cooperative Management of Cultural Resources with Associated Native American Groups

Develop cooperative agreements with associated Native American groups for cooperative management and interpretation of cultural resources in the park area.

B. OVERVIEW OF CURRENT PROGRAM AND NEEDS

1. MANAGEMENT STRATEGIES

Management of Kenai Fjords National Park requires that resources be managed so that natural processes can occur free of disruptive human activity. The NPS also wishes to preserve cultural sites which represent a valuable historic and prehistoric record of human activity in the park. Many sites have already succumbed to natural decomposition and decay, and they are no longer recognizable. Those that are recognizable need to be preserved and/or analyzed quickly before meaningful evidence disappears. Several of these sites probably warrant listing on the National Register of Historic Places. Significant sites need to be protected against vandalism.

Management activities can be subdivided into three parts: field reconnaissance and research, public education, and resource protection. Perhaps the most urgent needs are the archeological overview and assessment, a historic resource study and collection of oral histories. The Cultural Resource Documentation Checklist (Appendix C) indicates other products needed as a result of field work and research. These documents will help define public education and resource protection programs.

Public education will not only help the public understand cultural resources and their values in the park, but it may lead to sharing of discoveries with NPS personnel. Field reports, interpretive programs and displays at appropriate centers such as the park visitor center are needed to raise public consciousness about cultural resources in the park. Aspects of the values of these cultural resources and protective laws should be a part of

these educational programs. Finally, field rangers must patrol cultural sites and protect them from vandalism or other disruptive human activity.

Following the completion of a historic resources study, cultural zones may be established to further emphasize cultural use patterns in the park. At least three zones may be observed at the present time. These are the Coastal Archeological Zone, the Historic Nuka Bay Lode Mining Zone, and the Resurrection River Valley Historic Zone. Established management zones will help guide short and long term management of cultural resources.

Current program activities focus on documenting known cultural sites to more accurately assess the scope and complexity of site-specific management issues. The oiled archeological site (MR-1) is one example. Project statements address the need to continue this vital work and expand the scope of cultural resource program activities to include assessment of resources not yet known by the NPS. Each project statement addresses service-wide issues of high priority in park management.

Where appropriate, activities and funding will be coordinated with other federal and state agencies and private organizations. The NPS encourages and supports studies by recognized personnel of educational and scientific institutions, professional personnel of other agencies, and accredited individuals. Cooperation of this type has already taken place with regards to the Exxon Valdez oil spill. In this coastal park emphasis may be placed on interdisciplinary or multi-disciplinary research such as global climate change. Discoveries in archeological sites may yield information about paleoenvironmental conditions, past floral and faunal assemblages, and human responses to climate change. Major research efforts and significant discoveries will be submitted to appropriate professional journals to alert the scientific community of research potential in Kenai Fjords National Park.

As knowledge and use of the park increases with time, management needs for complete, present-time information becomes more imperative. Cultural and natural resource data will be gathered and compiled into a usable data base, and information will be summarized to aid park managers with identification and resolution of critical issues. Computerizing the growing data base provides park personnel with the capacity to retrieve, store, collate, and analyze information quickly. Once a Geographic Information System (GIS) is realized at the park, management efficiency and decision-making will be greatly enhanced.

2. CURRENT CULTURAL RESOURCE MANAGEMENT CAPABILITIES

The majority of resource management staff time and project

funding addresses natural resource issues in the park. The Alaska Region Science Initiative does not call for the addition of a cultural resource specialist at Kenai Fjords National Park, but it does request the addition of six Cultural Resource Specialists at the Regional Office to support park needs. At least one Cultural Resource Specialist may be dedicated largely to Kenai Fjords NP. Several Cultural Resource Specialists in the Regional Office have been concentrating large portions of their time on projects involving Kenai Fjords NP, particularly since oil spill to the park. As more cultural sites are discovered and better understood, the need increases for an employee with expertise in Cultural Resources.

At the present time the Superintendent is the only employee with substantial training and experience with cultural resources. The Superintendent and Chief Ranger manage most of the current mining issues which may relate to impacts on cultural resources at those sites. The Resource Management Specialist has field experience and basic familiarity with most of the cultural sites at the park, but has little specific training with cultural resources. The Chief Ranger and Resource Management Specialist have been exposed to two-day intensive training on ARPA as part of the annual five-day regional law enforcement refresher, but no employees at the park have yet attended the full five-day ARPA law enforcement training offered by the service. The park Interpretive Specialist has been designated as the lead person responsible for Oral Histories with assistance from the Resource Management Specialist. Seasonal employees maintain surveillance of cultural resource sites along the coast and Resurrection River Valley.

C. CULTURAL RESOURCE PROJECT STATEMENTS

KEFJ-C-201	Complete a Historic Resources Study (HRS)
KEFJ-C-202	Produce an Archeological Overview and Assessment
KEFJ-C-203	Conduct Archeological Identification and Evaluation Studies
KEFJ-C-204	Produce and Ethnographic Overview and Assessment
KEFJ-C-205	Conduct Ethnographic Field Studies
KEFJ-C-206	Manage natural history and cultural collections
KEFJ-C-207	Conduct coastal cultural resources monitoring
KEFJ-C-208	Preserve and protect historic structures
KEFJ-C-209	Develop geographic information system (GIS) database including cultural sites and values.
KEFJ-C-210	Develop a management plan in response to Native land conveyances
KEFJ-C-211	Develop interpretive programs on cultural history and traditional lifeways

KEFJ-C-212	Develop management plan for Nuka Bay Historic Mining District
KEFJ-C-213	Prepare an Administrative History
KEFJ-C-214	Inventory and develop a management plan for hazardous materials at historic mining sites

PROBLEM STATEMENT:

Historic resources occur in and outside of Kenai Fjords National Park, but no unifying study has been completed to document the nature and extent of these resources. Historic activities in the park range from Russian occupation and trade in the area to early explorations on the Harding Icefield. Baranof, Governor of Russian America in the 1790s, married a native woman and established a village in Resurrection Bay where the "Phoenix", the first large vessel in Alaska was built. The exact location of this village is not known. The Phoenix and other vessels under Russian and English employ were used to explore and trade along the coast of Alaska including the park area. Evidence exists that trade may have occurred along Aialik Bay in the park in the 1800s (Schaaf 1988). Russian navigators charted what is now the coast of the park in the 1840s (Tebenkof, 1852).

After the U.S. purchased Alaska from the Russians in 1867, the U.S. Coast Survey charted the coast and reported on coastal conditions. Several subsequent surveys of navigation conditions and a U.S. Geological Survey in 1909 (Grant & Higgins 1913) mapped the area. Prospectors soon explored coastal areas and discovered gold in the Nuka Bay District as early as 1909.

Seward was established in 1903 and chosen as the terminus for the Alaska Railroad from the gold fields in the interior. President Harding visited Alaska in 1922 to drive the golden spike in the railway. He died on the return trip to San Francisco. The Harding Icefield and Harding Gateway are named in his honor. Many other places in the area are named in honor of local area residents such as "Pete's Pass", "Lechner Glacier", "Pedersen Glacier", "McCarty Glacier" and others.

Gold mining took place in the Nuka Bay District between the 1920's and 1940s. Back issues of the Seward Phoenix Log newspaper describe it as a thriving mining community. Commercial fishing got a start along the coast about then too, and Josephine and "Herring Pete" Sather were featured prominently in trade and transportation between Nuka Bay and Seward. Abandoned gold claims and prospects sprinkle the coast. Rotting logs and stumps give testimony to some of the old sites not yet described in park literature.

Remains of old cabins and stumps occur elsewhere along the coast and along the Resurrection River as well. Not much is documented about who occupied these sites, but some of the structures are known. Oral histories and a literature search should help shed light on these questions. An Historic Resources Study addresses service-wide issues: C01, C05, C08, C10, C21, and C22.

RECOMMENDED ACTION:

A thorough search of available literature should be conducted initially including books, magazine articles, maps, back issues of newspapers, various land records and governmental surveys. The work will involve research at libraries and archives both in Alaska and in the contiguous 48 states. The literature should not only include coastal surveys, geologic surveys, and mining records, but also fish and wildlife survey records, and any other data recorded prior to establishment of the park such as recreational use on the Harding Icefield. Parallel or perhaps subsequent to a literature search, local area residents should be consulted for oral histories, personal collections and photographs.

This project is much too large for the park Resource Management Specialist, so it is recommended that Regional Office staff conduct the bulk of the work in consultation with park staff. Some ground work has already been conducted by the park RMS, former Regional Historian Bill Brown, and ARO Mining Historian Logan Hovis, in conjunction with the Division of Cultural Resources Mining Inventory and Monitoring program's field investigations. A field reconnaissance of historic mining features in Nuka Bay was conducted by regional office staff during the summers of 1989 and 1991. The work by Reynolds (1987) should be extended to include other known sites in the Resurrection River valley. Seward residents know some of the people who occupied and used the old trapper cabins in the area.

The primary end product will meet established Historic Resources Study standards as specified in NPS-28 and will include a narrative report addressing specific park concerns and compilation of an archive of historic source material, photographs and maps.

Travel costs to and in the park for two to three personnel are estimated to cost $20,000. If a large enough vessel is made available, this field work could be conducted simultaneously with an archeological survey of the coast.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
50,000/1.0	40,000/1.0	

Funding Sources

Park Base; Regional Base - Cultural Resources; CRPP (302)

COMPLIANCE:

Documentation will be on file at park headquarters and the Regional Office at the start of the project.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 1, section 1.6 (Non-destructive data collection, inventory, study, research and monitoring activities), and 516 DM 2 Appendix 2.

NHPA: (Section 106) The Alaska State Historic Preservation Office will be consulted during development of project design. XXX forms documenting activities will be submitted to and approved by the Regional Director prior to implementation.

ANILCA: Subsistence activities are not now permitted within Kenai Fjords National Park. The proposed action will have no known effect on subsistence uses and needs.

PROBLEM STATEMENT:

The nature, status and significance of the park's archeological resources are at present poorly known. There are 23 documented prehistoric and historic archeological sites along the coast, 7 of which were found on surveys responding to the 1989 EXXON Valdez oil spill. The sites include historic mining camps, Russian period trapping sites, prehistoric camps and substantial prehistoric villages dating to at least 1300 years ago. There are 5 recorded inland sites, along the Resurrection river; all assigned to the historic period. It has been previously thought that the south shore of the Kenai Peninsula may have been only peripherally used, perhaps by the neighboring Chugach, Koniag, and/or inland Dena'ina. However, a picture is now developing which suggests a rich though poorly understood historic and prehistoric occupation of this area. Many of the coastal sites are threatened by erosion and illicit collection of artifacts and have been already affected by one oil spill.

The archeological overview and assessment is needed to compile, review and evaluate all existing information on archeological resources in the park. This will form the basis for determining National Register eligibility of sites, for park planning, for cultural resources management and research planning, for land acquisition planning, for interpretation and for compliance with Federal regulations protecting cultural resources. This project addresses service-wide issues: C01, C02, C03, C10, C14, C18, C22 and C-other.

RECOMMENDED ACTION:

The archeological overview and assessment will compile and review all existing information on archeological resources within the park boundaries, including inholdings and selected lands. It will evaluate this information and assess the potential archeological resources as well. The overview will analyze the information against the backdrop of the natural environment and the paleoenvironment, in order to understand the distribution of sites and predict the location of unrecorded sites. The overview and assessment will contain descriptions of the natural environment, including terrestrial and marine resources; paleoenvironment and paleoclimate, including tectonic and glacial histories and identification of topographic features related to past geologic events (uplifted shorelines, terminal moraines, etc.); a summary of regional culture history; a description and evaluation of past research; a summary and evaluation of current knowledge about the archeological resources; and research designs for future research. It will also contain comprehensive information about the location of collections, field records and

archival sources pertinent to park resources.

All site information will be coordinated with the regional Cultural Sites Inventory. Development of historic themes and contexts will be consistent where possible with the Alaska Comprehensive Historic Preservation Plan of the State Historic Preservation Office and the Historic Resources Study.

It is estimated that the overview and assessment can be completed by a GS-193-09 archeologist in 1.5 years. The work will be conducted in close cooperation with the park staff, in particular the Resource Management Specialist. Collection of information will also require cooperation with several state and federal agencies and private Native corporations. The budget includes travel to archives, acquisition of information sources, drafting, graphics and publication costs.

Budget and Staffing

FY1 ($/FTE)	FY2($/FTE)
$45,000	$30,000

Funding Sources
Regional Base - Cultural Resources

COMPLIANCE:

The archeological overview and assessment is a basic cultural resource document defined in NPS-28, Cultural Resources Management Guideline, as ideally in place prior to preparation of the park General Management Plan and Statement for Management. It is a preliminary step in meeting the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

KEFJ-C-203 **CONDUCT ARCHEOLOGICAL IDENTIFICATION AND EVALUATION STUDIES**

PROBLEM STATEMENT:

Archeological surveys in Kenai Fjords National Park have been piecemeal and limited in scope, consisting of site specific surveys of ANCSA 14(h)(1) selected lands conducted by the BIA, survey of patented mining claims by the NPS and most extensively, survey of oil impacted coastal areas in response to the 1989 EXXON Valdez oil spill. Based on information from these limited surveys, it is known that there are regionally important archeological resources within legislated park boundaries, including some on lands selected for Native withdrawal and some on lands managed by the Alaska Department of Natural Resources. It is also known that the majority of the reported coastal archeological sites have been affected by a history of dramatic geological processes and are presently undergoing significant erosional damage. Reports of damage to sites by looting, have also been received. Sites on the coast, especially on Nuka Island and along Nuka Passage, are now well known as a result of the oil spill cleanup activities, and are vulnerable to looting.

Archeological identification studies - comprehensive field surveys - are needed to record the locations and characteristics of the archeological resources within the park boundaries. Identification studies must be linked with evaluation studies, in order to assess site significance and research potential, for determination of National Register eligibility and to address interpretive, research and management concerns. Sufficient data must be collected from sites during the identification surveys to allow for the evaluation analyses. With an archeological overview and assessment in place, the field surveys can be directed toward topographic features determined to have high potential, and problem-oriented to address identified research needs. These studies address service-wide issues: C01, C02, C10, and C14.

RECOMMENDED ACTION:

The archeological identification and evaluation project is envisioned as a five year project, with the first two years of survey and testing focussed on the park's coastal lands, a third year of survey and testing in the interior lands and the final two years spent on evaluation of the data collected and report preparation. The survey and testing program will be guided by the archeological overview and assessment, so that surveys will be aided by information about known site patterns and about past geological events affecting site location. Data collection at sites will be based on identified research and management needs.

Known archeological sites, such as the Denton Site (XBS-014), SEL-119 along Nuka Passage and XBS-020 in Harris Bay that require further documentation and data collection should be included in the study.

The survey team should be interdisciplinary, consisting at least of a lead project archeologist, a geomorphologist and two seasonal archeologists. The geomorphologist is a key team member because of the importance of identifying the landscape history and the paleoenvironmental context of sites discovered, and also to aid in identifying topographic features with high site potential. Minimal testing should be employed at select sites to recover radiocarbon-datable material for age determination, so that a chronology of the culture history can be developed for this area. Information about site use and function, and number of cultural components should also be gathered through minimal testing where appropriate.

The coastal portion of the survey is a priority because of already identified critical research and management concerns. This research will require the support of a vessel with water to land launching capabilities and probably the use of kayaks, for thorough coverage of the shoreline. A large support vessel may have to be leased or chartered. It is likely that the vessel could be shared by other researchers conducting shoreline studies (see KEFJ-N-101.2, KEFJ-N-102.1, KEFJ-N-108.1, KEFJ-N-112.1, and KEFJ-N-113.1).

Consultation with interested Native groups, interested local communities, and appropriate state and federal agencies will be conducted prior to the field work. This gives these groups opportunities to provide information about the project, to make comments, and to become involved in the project.

The report will include professional-level descriptions and analyses of the data collected including: site maps and appropriate illustrations, determinations of National Register eligibility, management recommendations, future research recommendations, and recommendations for archeological treatment projects and data recovery projects. Sensitive site information will be contained in a separate volume with restricted distribution. A separate, popular report will be prepared for interpretive use and for public benefit. Based on the project results, the RMP should be updated to include project statements for recommended archeological research projects.

All site information collected will be coordinated with the regional Cultural Sites Inventory.

The budget is based on hiring a temporary GS-11 project archeologist for five years, to be responsible for designing the study, and carrying out the study through completion of the

analysis and report; a GS-09 temporary archeologist year-around position for field and laboratory work during the first three years of the project; a geomorphologist for the first two field seasons; and two seasonal GS-07 archeologists for the first three years, field season only. The budget includes costs of logistical support, travel, analysis (such as radiocarbon dating), photo documentation, drafting and report publication.

Budget and Staffing

FY1 ($/FTE)	FY2($/FTE)	FY3($/FTE)	FY4($/FTE)	FY5($/FTE)
$130,000	$130,000	$93,000	$50,000	$50,000

Funding Sources

Park Base; Regional Base - Cultural Resources; other Agency

COMPLIANCE:

The archeological identification and evaluation studies are basic cultural resource documents defined in NPS-28, Cultural Resources Management Guideline. They provide the data and analysis necessary to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

KEFJ-C-204 PRODUCE AN ETHNOGRAPHIC OVERVIEW AND ASSESSMENT

PROBLEM STATEMENT:

The park currently has very little ethnographic baseline information about traditional and current Native resource and land use in the park, nor about the sociocultural systems of the ethnic groups historically associated with the park area. This basic information is needed to develop management plans to protect cultural resources such as sacred sites; to understand the cultural significance of certain sites, structures or natural areas; to understand and protect traditional subsistence practices; to develop working relationships with appropriate Native or ethnic groups; to develop relevant interpretive programs; and to provide the context for developing specialized ethnographic studies. This project addresses service-wide issues: C01, C04, and C-Other.

RECOMMENDED ACTION:

The ethnographic overview and assessment will compile, describe and evaluate all existing ethnographic information pertaining to contemporary and historic Native use of the park area. This includes summaries of ethnographic data pertaining to the ethnic groups, information about their religious, subsistence and other cultural uses of park resources, evaluation of the ethnographic data, development of management recommendations and research designs for focussed anthropological research. The final product will also include a complete listing of bibliographic references, locations of collections (historic photographs, tapes, artifacts, etc.) and identification of knowledgeable local informants.

The work will be conducted in full consultation and cooperation with park-associated Native groups, in accordance with the NPS Management Policies (1988) and with the federal regulations listed below. Information about culturally sensitive areas will be kept confidential and will be treated in accordance with the recommendations of the associated Native group(s).

All site information will be coordinated with the regional Cultural Sites Inventory.

The proposed budget includes salary for a GS-09 Anthropologist, costs for travel to archival sources, acquisition of source information, report illustrations and publication costs.

Budget and Staffing

FY1 ($/FTE)
$55,000

Funding Sources
Park base; Regional Base - Cultural Resources

COMPLIANCE:

The ethnographic overview and assessment is a basic cultural resource document defined in NPS-28, Cultural Resources Management Guideline, and ideally in place prior to the development of the General Management Plan. It provides the data and analysis necessary to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

KEFJ-C-205 CONDUCT ETHNOGRAPHIC FIELD STUDIES

PROBLEM STATEMENT:

Ethnographic information about the indigenous people occupying the outer Kenai Peninsula at the time of European contact is scarce, as is information about historic and contemporary Native use of the area that is now Kenai Fjords National Park.

Information about park-associated Native groups, their lifeways and their relationship to the land and resources now included in the park is needed in order to meet cultural and natural resource management needs and interpretation directives (see KEFJ-C-204).

Native elders knowledgeable about traditional resource use in the park area reside in local communities such a English Bay, Port Graham and Seward. Their knowledge about traditional subsistence patterns, sociocultural organizations and behavior, intergroup relationships, specific plant and animal use, resource management practices, weather patterns and climate history, wildlife population changes, changes in salmon streams, glacier movements and more, is invaluable and should be recorded as soon as possible. This is a resource, like the camps and dwellings left by their ancestors, that is vanishing with time.

This focussed anthropological research can also collect long term local observations that can in turn be used to address major research initiatives such as global climate change research. The information could greatly assist the archeological survey (KEFJ-C-203) both in the planning and evaluation stages and several natural resource research projects as well. This project addresses service-wide issues: C02, C04, C10, C26 and C-Other.

RECOMMENDED ACTION:

Professional cultural anthropological studies, conducted in cooperation with park-associated Native groups, should begin with research-focussed interviews of knowledgeable Native elders. This research could include collection of detailed life histories and should be guided by the findings and recommendations of the ethnographic overview and assessment.

The project is envisioned as a three year study, with the first two years devoted to collection of informant interviews and transcription of those interviews. Video footage, photographs and audio taping should be collected as appropriate for documentation purposes as well as for interpretation and publication needs. A professional report and a popular report will be published in the third year.

The budget includes salary for a GS-09 level Anthropologist for three years and costs of publication, travel, equipment, supplies, and informant fees.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
$55,000	$55,000	$45,000

Funding Sources
Park base; Regional Base - Cultural Resources

COMPLIANCE:

The ethnographic field studies collect and provide data necessary to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

PROBLEM STATEMENT:

Natural and cultural museum collections document park resources. Natural history collections of biological, paleontological, and geological specimens document the park natural resources inventory, biodiversity, rare and endangered species, and the validity of research projects by preserving voucher specimens and systematic collections. Collections from archeological and historic sites resulting from surveys, excavations, restoration and salvage document park cultural resources that cannot be left unprotected in situ.

Collections are used for documentation, verification of research, research and interpretation. Year round care of specimens, objects and records is required with proper storage equipment, security, and environmentally controlled storage conditions. Presently collections are stored at park headquarters in Seward and in the regional repository in Anchorage. Records of temperature and humidity have been recorded and continue to be recorded at park headquarters. Park space for collections is limited. At present, collections are stored in the park library.

Collections from the park at park headquarters, the regional office and non-NPS museums are of extreme value to the park. Access to the information contained in the collections is provided by Automated National Cataloguing System (ANCS). Objects and specimens must be accessioned, catalogued and entered into ANCS as they are added to collections, whether they be research projects by the park, regional personnel or non-NPS institutions.

Cataloguing requires uninterrupted time and specialized skills to accomplish the tasks correctly. Most collections are small at this time, but some collections related to the Exxon Valdez Oil Spill are large. Ongoing biological and geological research, and archeological and historic inventories, clearances, surveys and excavations are building collections rapidly. A backlog of collections made by non-NPS institutions throughout the nation is being inventoried. These collections need to be identified and catalogued into ANCS.

The park has minimal staff for a growing collection. EVOS has increased the need for the use of collections and collections management. Regional curatorial staff have supplemented park personnel in cataloguing collection backlog, lending a highly skilled and focused approach. Many biological and geological collections have not yet been catalogued, however sources are being identified by Investigator Annual Reports.

A Scope of Collections Statement was updated a couple years ago, but it has not been approved for the current year. The combined Collection Management Plan and Collection Storage Plan was in progress at Curatorial Service, Harpers Ferry Center. This project addresses service-wide issues: C01, C03, C09, C15, C16 and C20.

RECOMMENDED ACTION:

Update accessions and cataloguing of museum specimens from the park, and see that the Combined Collection Management and Collection Storage Plan are completed. Regional Office curatorial staff will continue to supplement park staff in cataloguing backlog and current material at the park until such time park staff are trained and allotted sufficient time to upgrade accountability.

Though the collection at the park is small at this time, collections maintained by the Regional Office of Oil Spill Coordination, other federal and state agencies, universities and Exxon are large and expanding. Also, cultural collections are expected to expand rapidly as historic and archeological surveys are conducted. Collections will continue to be stored at the regional repository, Alaska Regional Office.

The combined plan will provide guidance for changing personnel. It will outline procedures to update the Scope of Collections, identify security needs, provide fire protection, establish proper storage, maintain environmental control, and acquire appropriate staffing and program funds. Dedicated, controlled storage will be established in the park as space becomes available.

The park needs at least one person on the staff dedicated to cultural resources who would maintain collections and manage a wide range of park cultural resources projects. Eventually the position should be staffed as a GS-9 archeologist/historian. Funding estimates include training, travel, equipment and staff time to manage collections.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE	FY3 ($/FTE)
30,000/0.5	20,000/0.5	20,000/0.5

Funding Sources:

Park Base - Cultural Resources; Regional Base - Cultural Resources.

COMPLIANCE:

The Scope of Collections Statement is a basic cultural resource document defined in the Cultural Resources Management Guideline (NPS-28), Natural Management Guideline (NPS-77), and the Combined Collection Management Plan and Collection Storage Plan are special cultural resource documents defined in NPS-28. They provide the guidance to properly manage museum collections to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

The above guidelines (NPS-28 and NPS-77) and plans also provide the means to comply with Special Directive 80-1, Guidance for Meeting NPS Preservation and Protection Standards for Museum Collections, and 36 CFR 2.5g, requiring cataloguing of natural history specimens collected during all research projects in the park.

PROBLEM STATEMENT:

Archeological surveys conducted in response to the EXXON Valdez oil spill provide the best documentation to date about the condition and status of coastal archeological resources in Kenai Fjords National Park. This data reveals the tremendous amount of damage to coastal sites by natural processes such as tidal action, sea level changes, storm surges, earthquakes, etc. The damage is ongoing and cumulative resulting in the erasure of portions of the region's cultural record. The oil spill itself caused an as yet uncalculated amount of damage to the resource, both directly by contamination of archeological sediments and indirectly by exposure of the site locations to a multitude of cleanup workers. Sections of the coast receive heavy commercial and recreational use, and it is suspected that readily visible artifacts from eroding sites are illegally collected .

Systematic, regularly scheduled monitoring of selected coastal archeological sites is needed to assess site condition, erosional impacts, rates of erosion, and the occurrence of looting in order to meet management requirements listed below. This project addresses service-wide issues: C02, C18, C19, C20, and C25.

RECOMMENDED ACTION:

The selection of sites, or sections of the coastline to be monitored should be initially guided by the recommendations of the archeological overview and assessment and revised according to the archeological survey findings.

The coastal cultural resource monitoring project should be an ongoing, annual activity. During the first year of monitoring, permanent reference points should be established in key areas so that rates of erosion and effects on archeological sites can be measured. The reference points can also be used as photo stations, so that over time, a series of sequential site photos will be obtained from the same perspective, providing a "time-lapse" record of change. Tide gage stations should also be established to monitor fluctuations of sea level in key areas. Site maps produced by the archeological identification and evaluation studies (KEFJ-C- 203) should be used to identify and record any areas of change at sites (such as loss of surface artifacts, loss of site area to erosion, tide level in relation to the site, the locations of looter's excavations, animal disturbance areas, etc.).

Information collected, particularly the type and degree of threats and disturbances (including looting incidents) should be

incorporated into the regional Cultural Sites Inventory and into the GIS cultural resource database (KEFJ-C-207).

This should be a coordinated effort with other coastal resource monitoring projects such as KEFJ-N-101.2, KEFJ-N-102.1, KEFJ-N-108.1, KEFJ-N-112.1, and KEFJ-N-113.1.

Budget and Staffing

FY1 ($/year) ongoing

$10,000

Funding Sources

Park base

COMPLIANCE:

The coastal cultural resources monitoring program will collect data enabling the park to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

PROBLEM STATEMENT:

Several historic structures throughout the park have been located, and many are collapsing as a result of unoccupancy and a harsh climate. These structures relate to historic lode gold mining in the Nuka Bay District and trapping and placer mining along the Resurrection River corridor. Most historic structures have completely collapsed along the coast of the park in the Nuka Bay District where precipitation is much heavier. Remnants of structures remain at many sites such as in Surprise Bay, Beauty Bay and Shelter Cove. The Placer Creek cabin is the only intact historic structure still standing along the Resurrection River.

An Historic Structure Report (HSR) is needed to guide preservation and protection measures for the Placer Creek Cabin and any other historic structures in the park deemed worthy of preservation. Also, an Historic Furnishings Report is needed to determine which furnishings and objects to display and which to remove and curate at the Placer Creek Cabin and other historic sites in the park. The Placer Creek Cabin presents wonderful interpretive potential. This project addresses service-wide issues: C01, C04, C05, C07, C21 and C26.

The roof of the Placer Creek Cabin was reshingled in 1983 following recommendations outlined by then Regional Historian Bill Brown. Basal logs of the cabin are presently rotting, and the structure may collapse under successive winter snow loads. The old barrel stove is rusted thin, and any fires built in it by visitors threaten to burn the structure down. Porcupine and other rodents are masticating various wooden and paper items associated with the cabin. Snow has been shovelled from the roof by park personnel since 1983.

RECOMMENDED ACTION:

Produce an HSR and an Historic Furnishings Report for the Placer Creek Cabin. Follow up with a Cultural Resource Preservation Program project to rehabilitate and maintain the Placer Creek Cabin. Continue to direct park personnel to shovel heavy snow loads from the roof during winter. This cabin merits such attention and effort since it is the only standing remnant of the trapping and prospecting era along the Resurrection River in Kenai Fjords NP or adjacent Chugach National Forest. The cabin may be restored to the point that it can be used as a patrol cabin, public use cabin or emergency shelter. The need for a public use cabin in the area is diminished, however, by the presence of a relatively new public use cabin less than two miles distant in Chugach National Forest.

The HSR and Condition Assessment will be completed by the Regional Historic Architect or appropriate assistant. The Historic Furnishings Report can be conducted by Regional Office staff or park staff with appropriate training. Preservation work can be conducted by park staff with guidance from the Regional Historic Architect. The budget includes travel and report costs by Regional Office staff, and estimated repair costs for the Placer Creek Cabin.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
10,000	35,000	

Funding Sources:

Park Base - Cultural Resources; Regional Base - Repair/ Rehabilitation and Cultural Resources Cyclic Maintenance; Servicewide - Cultural Resource Preservation Program.

COMPLIANCE:

The coastal cultural resources monitoring program will collect data enabling the park to meet the provisions of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

KEFJ-C-209 **DEVELOP GEOGRAPHIC INFORMATION SYSTEM (GIS) CULTURAL RESOURCE DATABASE MANAGEMENT SYSTEM**

PROBLEM STATEMENT:

Effective management of cultural resources in Kenai Fjords National Park requires that large amounts of archeological data be understood in the context of a complex set of variables. Such variables include site location, significance, land status, land use, threats and disturbances, survey coverage, vegetation type and cover, soils, topography and permafrost features, watersheds, distribution of marine and terrestrial wildlife populations, paleolandforms and paleoenvironmental factors. Further, this data must be understood in such a way that it enables discernment of broader regional relationships.

There is a problem in manipulating this large and disparate volume of data without the aid of computer capabilities. Data retrieval is difficult, costly and time consuming, making timely and competent resource assessments for management response and research needs very difficult (as seen in the EXXON Valdez oil spill response).

There is a critical need to develop GIS data management capabilities for cultural resource data. A GIS can manipulate multiple data layers and can provide access to one or several data layers for a single location, several locations or large regions. Once the data entry is complete, relatively rapid and low cost maps can be produced showing selected data overlays. Prehistoric land use systems can be modeled and simulation studies of climate and landform changes relevant to site distribution can be conducted. This project will assist with service-wide issues: C02, C04, C05, C07, C10, C11, C14, C18, C19, C21 C22, C26 and C-Other.

RECOMMENDED ACTION:

The project will develop and apply GIS capabilities toward meeting critical cultural resource management and research needs in Kenai Fjords National Park. The work can be done at the Alaska Regional Office, by an archeologist, or at the park if a GIS station is acquired there. The benefit of having an archeologist do the GIS manipulations is the expertise in understanding the complexities of the archeological data.

Prior to the use of the GIS system, training in GRASS 4.0 (Introduction to GIS and Advanced Grass Applications) should be completed.

The project will involve:

(1) classification of known site types,
(2) collection of a variety of information sources (terrain data, soil type, near-offshore terrain data, and other environmental data),
(3) rectification and digitization of the information as needed,
(4) creation of selected data layers,
(5) report preparation and publication.

Research will be conducted to select cell size for analysis, modeling and mapping; system software will be selected for statistical analysis and scientific graphics; and information sources and resource data will be collected.

In creating the data layers, care will be taken to minimize the introduction of error by documenting steps used in making new files, tracking intermediate files and checking for source accuracy and imagery rectification. All ARO GIS quality assurance standards will be met. An emphasis on maintaining accuracy is essential for utility of the data files as a resource management and research tool.

All data files created that will contain sensitive archeological site location information will be kept confidential and protected by a password. Use of these files must be approved by the Regional Archeologist.

Once the data layers are created, special applications will be developed to model prehistoric and historic settlement patterns, to understand the known distribution of sites and to predict the location of sites in unsurveyed areas. Diachronic simulation studies of late Quaternary and Holocene environmental changes and landscape formation processes should be conducted and would be essential for understanding the distribution of recorded sites.

A final step will be the preparation of a report containing two major components:
(1) a detailed description of methods and techniques used in setting up and manipulating the data base and in analyzing the data, and
(2) an analysis and interpretation of the data in terms of prehistoric and early historic land use patterns.

The GIS cultural resource files (and related environmental data layers) created will be interfaced with the servicewide Cultural Resource Inventory-Archeological Resources Inventory computerized database, currently being developed in WASO.

The budget includes salary for a GS-09 level archeologist for one year, costs for acquisition of software and source information, costs for training and travel, and report preparation costs.

Budget and Staffing
FY1 ($/FTE)

$55,000

Funding Sources

Park base; Regional Base - Cultural Resources

COMPLIANCE:

This project will develop a GIS cultural resource database management system that will greatly aid in identification and tracking of research and management needs and issues; enabling the National Park Service, Alaska Region to meet the requirements of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

The database will facilitate revision of the park's General Management Plan, Resource Management Plan and Archeological and Ethnographic Overviews and Assessments. It will provide an essential tool for planning cultural resource inventories, problem-oriented research, research that is regional in scope, and will enable maintenance of up-to-date cultural resource inventories for the Regional Archeologist and the park Resource Management Specialist.

KEFJ-C-210 **DEVELOP A MANAGEMENT PLAN IN RESPONSE TO NATIVE LAND CONVEYANCES**

PROBLEM STATEMENT:

English Bay and Port Graham Native Village Corporations are attempting to finalize land selections from withdrawn lands in Kenai Fjords National Park pursuant to the Alaska Native Claims Settlement Act (ANCSA). The corporations are entitled to some 77,000 acres of non-submerged lands out of about 120,000 acres of withdrawn lands along the mountainous coast of the park. About half of the coastline would revert to Native ownership. Only the Aialik Peninsula, parts of Aialik Bay and the inner recesses of Northwestern and McCarty fjords would remain in park ownership.

Though selections are be to made from contiguous sections of land to consolidate land management practices, the integrity of the park coast will be segmented. Large tracts of private land will allow hunting, logging, mining, developments such as lodges, aquaculture and other land management practices not normally allowed in national parks. These activities could adversely affect significant cultural and natural resources in the park and region. These changes will greatly complicate land management in the area. The National Park Service needs to develop a land management strategy to respond to an impending land ownership pattern. This project addresses service-wide issues: C01, C04, C05, C08, C10, C18, C19, C22, C26 and C-Other.

RECOMMENDED ACTION:

Develop a management contingency plan to respond to impending Native land selections. This plan will build on the existing Land Protection Plan and lay out strategies to best protect lands and resources adjacent to selected lands. This may include negotiations with Native land owners for cooperative management of adjacent lands, increased patrols of park coastal lands adjacent to selected lands, boundary surveying and marking, and intensified dissemination of public information regarding land management practices on park and Native lands. Where possible, the NPS may strive to acquire fee title to highly significant lands selected by Native Corporations to protect primary park resources and values. This would be conducted on a willing seller basis only. Budget and funding for this project consider the planning process only.

Budget and Funding:

FY1 ($/FTE)

10,000

Funding Sources:

Park Base - Natural and Cultural Resources; Regional Base - Other.

COMPLIANCE:

Project documentation will be filed at park headquarters.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 7.4, B(10) (Preparation of an internal plan ... preliminary to the process of preparing a specific Service proposal or set of alternatives for decision).

NHPA: Section 106 clearance will not be required since ground-breaking activity is not planned and impacts will not occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

KEFJ-C-211 **DEVELOP INTERPRETIVE PROGRAMS ON HUMAN ECOLOGY AND TRADITIONAL LIFEWAYS**

PROBLEM STATEMENT:

At the time the Kenai Fjords General Management Plan (1984) was written, the lack of cultural resource information was reflected in the statement, "Interpretive themes will focus on the primary resources of the park - ... and possibly the prehistory and history of the area." It is now known that the park's cultural resources are indeed a primary resource. Interpretation is needed to foster an understanding, appreciation, and protection for these resources. This information needs to be translated to park staff and interpreted to park visitors, community residents and local schools. This project primarily addresses service-wide issue: C26, but it may also assist with C18, C19 and C-Other.

Public interest in archeological and ethnographic artifacts from this region is longstanding. Encouraged by popular exhibits such as the Smithsonian Institution's "Crossroads of the Continents" exhibit, and by exposure of sites to large numbers of oil spill response personnel, interest continues to increase. Interpretation of the value of these artifacts in their cultural context and education about that cultural context is a critical need. This cultural context includes not only details of past lifeways, but also an understanding of past lifeways as functioning components in the broader ecosystem (human ecology). Integration of cultural resource information with information about the natural environment/paleoenvironment, highlighting their interrelationship, is essential.

RECOMMENDED ACTION:

The Kenai Fjords National Park Interpretive Prospectus (1990) identifies the need for interpretation of precontact lifeways and adaptations for the enjoyment and education of the public.

Interpretation of human ecology and traditional lifeways could include: development of exhibits using existing collections (e.g. the McArthur Pass site and Denton site collections); development of informational handouts, site bulletins, and publications for public distribution or sale through the Alaska Natural History Association; development of multimedia presentations which accurately depict what is known about the lifeways of park-associated Native groups and prehistoric peoples (representations should highlight interrelationships between the human groups and their respective environments); development of archeology and cultural anthropology units and training packages for use in local schools; and development of cooperative outreach programs involving Native elders, Native Corporations and other interested

individuals, state and federal agencies.

Data collected from ethnographic and archeological research projects (KEFJ-C-202, KEFJ-C-203, KEFJ-C-204, KEFJ-C-205, KEFJ-C-207 and KEFJ-C-208) will provide core information for the interpretive program. The program will be developed in full consultation with park-associated Native groups with opportunities provided for active involvement of interested individuals.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)	FY3 ($/FTE)
$16,000/0.5	$20,000/0.75	$30,000/1.0

Funding Sources

Park base; Regional Base - Cultural Resources; other agency

COMPLIANCE:

The development of interpretive programs on human ecology and traditional lifeways is needed to meet the recommendations of the park's Interpretive Prospectus, the policy set forth in NPS-6, and the requirements of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

KEFJ-C-212 **DEVELOP MANAGEMENT PLAN FOR NUKA BAY HISTORIC MINING DISTRICT**

PROBLEM STATEMENT:

The Nuka Bay region of Kenai Fjords National Park was a regionally significant lode gold mining district prior to 1940. Prospecting in the area began as early as 1909. At least five mines produced gold at some time between 1924 through 1940. Archeological evidence of the mining activity has been documented at eleven sites. Several, including the Nukalaska, Nuka Bay, Alaska Hills, Sonny Fox, and Larson & Rossness mines, are complex sites containing the remains of mineral extraction and processing operations. The archeological survey documentation of the eleven known sites strongly suggests the district is an ideal area for investigating and interpreting the technical and social aspects of life and work in small-scale Alaskan gold mines during the 1920s and 1930s.

At the present time, insufficient historical documentation is available to assist in the interpretation of the archeological data. Once a historic overview and site specific studies are prepared for the Nuka Bay area, it will be possible to make informed comparative statements about the district and the relative significance of the eleven sites contained within the district. A historic evaluation of the district and an analysis of the known sites on the basis of that evaluation is needed prior to the formulation of a detailed management plan for the Nuka Bay mining district.

Once completed, the historic overview of the district and site specific histories should be used in conjunction with the archeological data to make a comparative evaluation of the resources and prepare recommendations for the management of the district and the sites. This project addresses service-wide issues: C01, C08, C11, C18, C19, C20, and C-Other.

RECOMMENDED ACTION:

Establish the relative significance of the eleven sites on the basis of historic research, and complete a multiple property National Register Nomination using "Lode Gold Mining on Nuka Bay, 1909 - 1940" as the historic context. The individual properties can then be evaluated against the larger theme in terms of the role played in the development of the mining industry, in terms of historic integrity, and as potential educational and visitor services.

Use historic and archeological evidence to determine and evaluate the best methods to interpret the sites to the public such as

publications, audio-visual displays, and public access. In addition, an evaluation of threats to the resources should be made and methods proposed to stabilize or otherwise mitigate the sites with regards to findings resulting from the National Register nomination process. If enhanced public access to the sites is deemed appropriate, plans for landings, trails and other facilities should be developed at the same time that an appropriate method of on site interpretation is determined.

It is estimated that the research necessary for and the writing of the multiple property National Register Nomination and the preparation of a report on management recommendations can be completed by a GS-9 Historian in 1.5 years. The historian should have experience in mining history and historical archeology. The budget includes travel to archives and site visits.

Budget and Staffing

FY1 ($/FTE)	FY2 ($/FTE)
$40,000/1	$20,000/0.5

Funding Sources

Park Base; Regional Base - Cultural Resources

COMPLIANCE:

Development of the management plan will enable the park to meet the requirements of the National Historic Preservation Act (as amended 1980), the National Environmental Policy Act (42 USC 4371...), and the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46).

PROBLEM STATEMENT:

An administrative history records the story of the park as an institutional entity. This includes NPS programs and activities transcending park jurisdiction. The Administrative History describes how the park originated, functioned and evolved to the present. It informs current and future park personnel of past problems and their solutions, including successes and failures. The phrase "administrative history" is used broadly to cover movements leading to park establishment, legislative background, and other contributing developments beyond administration in the strict sense.

The concept of a park along this rugged, spectacular coast of Alaska was conceived subsequent to the Alaska Native Claims Settlement Act (ANCSA) in 1971. Section d-2 of ANCSA directed the Secretary of the Interior to study lands in Alaska that would qualify for national conservation units. The National Park Service task force identified the Harding Icefield-Kenai Fjords National Monument as a prime candidate. What eventually became the park was set aside as Kenai Fjords National Monument by Presidential Proclamation in 1978. Kenai Fjords National Park was established in December 1980 by ANILCA, and it is now over one decade old. Several park documents have been completed and approved including the Exit Glacier DCP, the SFM, the original RMP, the GMP, the LPP, a Wilderness EIS and several other subsidiary documents. The park has sustained injuries from the nation's largest oil spill, EVOS. The area now faces major land selections by Native Corporations. Enough has occurred over the last two decades to warrant preparation of a thorough administrative history. It should be completed prior to the update of the GMP which is scheduled to occur in 1994.

RECOMMENDED ACTION:

Prepare a park administrative history prior to updating the GMP in 1994. Research for the document should commence during the 1992-93 winter to allow ample time to complete the project before revision of the GMP in 1994. The report may be illustrated with appropriate photography including references to video footage. The administrative history will contain:

* a brief statement describing the park--its location, primary resources, values, purpose, and significance;

* an account of area management and use prior to NPS incorporation, especially as area management and use affected subsequent Service administration, with particular coverage of preservation efforts or commemoration by

individuals, association, or other governmental entities;

* a discussion of the movement to bring the area into the NPS, culminating in its establishment as a unit of the National Park System, with emphasis on the key organizations and individuals promoting--and opposing--park establishment, as well as their motivations, involvement and positions taken by the Service and Interior Department, and the legislative process as revealed by congressional bills, hearing, committee reports, floor debate, and final enactment;

* discussion of major activities and events affecting the area under NPS administration, e.g., master or general management planning; land acquisition; development of administrative and visitor facilities; natural resource management; cultural resources management; private organizations; interpretation; recreational and other public use; new or amended park legislation. Topics selected for detailed coverage should have concerned past park managers and/or be relevant to present and foreseeable management concerns.

* appendices) containing copies of key park legislation, executive orders, cooperative agreements, personnel rosters, visitation statistics, and other documents and data valuable for management reference (NPS-28, Cultural Resources Management Guideline).

Administrative historians must follow the accepted canons of the historical profession. Administrative histories should be planned in consultation with the Bureau historian. The administrative history can be implemented through several options, for example, cooperative agreement, contract, or task directive. All options require consultation between Park and Regional staff to develop an outline, schedule for completion, and budget. This project should take less than one year to complete. Budget and funding include costs of travel, communications, and printing or copying.

Budget and Staffing

FY1 ($/FTE)
$60,000/1.0

Funding Sources

Park base; Regional Base - Cultural Resources; other agency

COMPLIANCE:

The administrative history is a basic cultural resource document defined in NPS-28, Cultural Resources Management Guideline as an essential park planning document.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 7.4, B(10) (Preparation of an internal report, plan, study or other document ... preliminary to the process of preparing a specific Service proposal or set of alternatives for decision).

NHPA: Section 106 clearance will not be required since ground-breaking activity is not planned and impacts will not occur to historical or prehistorical resources.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park. This study would not effect subsistence harvest of any species.

KEFJ-C-214 **INVENTORY AND DEVELOP MANAGEMENT PLAN FOR HAZARDOUS MATERIALS AT HISTORIC MINING SITES**

PROBLEM STATEMENT:

Kenai Fjords National Park has become more and more popular with tourists and adventurers. As a result people seek out special sites such as historic mine sites. Surveys and inventories of historic mine sites, primarily in the Nuka Bay Mining District, have revealed hazardous materials such as abandoned explosives and caustic chemicals. These locations pose hazards to life and limb of unsuspecting visitors. An inventory and management plan are needed to document and remove these hazards from the park to provide for visitor safety and protect cultural resources. This project addresses service-wide issues: C01, C10, and C20.

Lode gold mining in the area prior to World War II used high explosives such as Giant and Atlas Gelex TNT. Many historic mining sites in the park have not yet been thoroughly documented, and it is suspected that more hazardous material remains to be discovered. NPS personnel who inventory historic mining sites should be trained to recognize hazardous materials and directed to document their presence without subjecting themselves to injury. Parties that inventory abandoned mining lands (AML) should include a qualified AML coordinator.

Subsequent plans must be devised to remove or mitigate hazardous materials in the park.

RECOMMENDED ACTION:

Complete an inventory of all hazardous materials on abandoned mining lands in Kenai Fjords National Park. This has been accomplished at some surface sites to date in the Nuka Bay Mining District, but many subsurface locations in abandoned mining tunnels have not yet been thoroughly examined and inventoried. Conduct this project in cooperation with the Regional AML coordinator.

Develop a Plan to mitigate or remove hazardous materials inventoried at historic mining sites. Complete the plan and conduct the necessary field work as soon as practical to minimize exposure of the public to these hazardous materials. The Regional Explosives expert will conduct the necessary removal of explosives in the field. Park personnel will assist with logistics where needed. All applicable federal and state laws and regulations regarding the handling of these substances will be strictly followed.

The budget includes estimates of costs of travel, helicopter and explosives needed to mitigate hazards and threats in the park.

Budget and Staffing:

FY1 ($/FTE)	FY2 ($/FTE)
10,000	8,000

Funding Sources:

Park Base - Cultural Resources and Natural Resources, Law Enforcement and Maintenance; Regional Base - Repair-Rehabilitation.

COMPLIANCE:

Project documentation will be filed at park headquarters and the regional office.

NEPA: The project would be categorically excluded as determined from 516 DM 2 Appendix 2, 2.1 (Have significant adverse effects on public health or safety).

NHPA: Section 106 clearance will be required since disturbance to the ground may be necessary where explosives are detonated in place and impacts to historical or prehistorical resources may occur.

ANILCA: The activity is consistent with the mandates stated in section 201 (5) regarding the establishment of Kenai Fjords National Park. Section 810 evaluation will be completed, but presently subsistence activities are not allowed in Kenai Fjords National Park.

V. SUBSISTENCE ANALYSIS

ANILCA Section 810(a) Summary Evaluation and Findings

1. INTRODUCTION

This section addresses Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), 16 USC Section 3120. It summarizes the evaluations of potential restrictions to subsistence activities which could result from project activities resulting from the Resource Management Plan for Kenai Fjords National Park.

II. EVALUATION PROCESS

Section 810 (a) of ANILCA states:

> "in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands...the head of the federal agency...over such lands...shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and the other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency -
>
> (1) gives notice to the appropriate State agency and the appropriate local communities and regional councils established pursuant to section 805;
>
> (2) gives notice of, and hold, a hearing in the vicinity of the area involved; and
>
> (3) determines that (a) such a significant restriction of subsistence uses is necessary and consistent with sound management principles for the utilization of the public lands, (b) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of use, occupancy or other disposition, and (c) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

ANILCA created new units and additions to existing units of the National Park Service system in Alaska. Kenai Fjords National Park was created by ANILCA for the following purposes, among others:

"To maintain unimpaired the scenic and environmental integrity of the Harding Ice Field, its outflowing glaciers and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes. In a manner consistent with the foregoing, the Secretary is authorized to develop access to the Harding Ice Field and to allow use of mechanized equipment on the ice field for recreation."

The potential for significant restriction must be evaluated for the proposed action's effect upon "...subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use." Kenai Fjords National Park is closed to subsistence (36 CFR 13.67).

III. PROPOSED ACTION ON FEDERAL LANDS

The proposed action calls for acceptance of a Resources Management Plan which outlines the need for various projects to understand and protect natural and cultural resources in Kenai Fjords National Park, Alaska. The proposed action will have virtually no adverse impact on wildlife or vegetation. No subsistence activity is known to occur on land in the park.

IV. AFFECTED ENVIRONMENT

The mountain goat is presently the only customary and traditional subsistence resource recognized by the State of Alaska in Game Management Unit 7 (which includes Kenai Fjords National Park). Subsistence users of this resource are the residents of English Bay and Port Graham. The subsistence hunting area, located between Rocky Bay and Tutka Bay on the southwest part of the Kenai Peninsula, is not near the affected environment. Subsistence fishing for salmon and harvest of intertidal organisms and kelp occur in areas much closer to these two villages, and to a lesser extent near Seward. A few village hunters take marine mammals such as harbor seals for subsistence near Seward, English Bay and Port Graham.

V. SUBSISTENCE USES AND NEEDS EVALUATION

The Potential to Reduce Populations

The proposed plan will not significantly reduce resource populations. Impacts on habitat will be minimal and increased competition from non-subsistence harvest will not occur.

Restriction of Access

No restrictions or interference with access for subsistence hunter/gatherers will result from this action since no subsistence use is known to occur in the affected environment.

Increase in Competition

Subsistence hunting is prohibited in the Kenai Fjords National Park, so the proposed action would cause no increase or effect on competition for subsistence hunting.

VI. AVAILABILITY OF OTHER LANDS

No other lands are available for the proposed plan.

VII. ALTERNATIVES CONSIDERED

Alternative statements for each project could be considered. The project statements will be revised annually to incorporate public and agency comments, and to reflect changes in priorities from year to year. None of the projects considered would have any discernable impact on subsistence use.

VIII. FINDINGS

This analysis concludes that the proposed action will not result in any significant restriction of subsistence uses.

APPENDIX A

FY: 91
PARK: KEFJ
Region: ARO

TABLE 1
NPS RESOURCE PERSONNEL
(current year only)

TYPE OF NPS EMPLOYEE	FTEs OF RESOURCES WORK		
	Natural	Cultural	Total
Research Scientists			
Resources Specialists	0.9	0.1	1.0
025 Park Rangers Res Mgmt	1.4	0.1	1.5
025 Park Rangers Res Pro	0.5	0.1	0.6
025 Park Rangers Res Int	0.2	0.1	0.3
Maintenance Personnel			
Total of RES Personnel	3.0	0.4	3.4
TOTAL PARK FTE: 3.4 PERCENT	88.2	11.8	00.0

TABLE 2
CURRENT YEAR NATURAL AND CULTURAL RESOURCES FUNDING
($ in thousands - funding by activity type)

FY: 91
PARK: KEFJ
REGION: ARO

FUNDING SOURCE	TOTAL	RESEARCH DOCUMEN-TATION	MITIGA-TION / TREATMENT	MONITOR-ING	PROTECTION	INTERPRE-TATION	PROGRAM ADMIN / TRAINING
PARK-CR	20.0			3.0	5.0	2.0	10.0
REGN-CR	10.0				10.0		
RGCR-OTH	40.0		20.0	20.0			
CRNON-NPS	80.0		80.0				
PARK-NR	47.0			37.0	10.0		
RGNR-OTH	10.0			10.0			
REGN-NR	42.0	20.0	20.0	2.0			
NRNON NPS	107.0	100.0		7.0			
ALL SOURCES	356.0	120.0	120.0	79.0	25.0	2.0	10.0

APPENDIX B

PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICEWIDE ISSUE	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
104	CONDUCT SURVEY OF PARK VISITORS			N18 N20		RES	10.0	0.5	2.0	0.2					12.0	0.7
			TOTAL FOR ALL ACTIVITIES				10.0	0.5	2.0	0.2					12.0	0.7
106	MONITOR MOUNTAIN GOAT & MOOSE POPULATIONS			N20		MON	10.0	0.1	10.0	0.1	10.0	0.1	10.0	0.1	40.0	0.4
						MON	2.0	0.1	2.0	0.1	2.0	0.1	2.0	0.1	8.0	0.4
			TOTAL FOR ALL ACTIVITIES				12.0	0.2	12.0	0.2	12.0	0.2	12.0	0.2	48.0	0.8
107	MONITOR BALD EAGLE & OTHER RAPTOR POPULATIONS			N20 N24		MON	4.0	0.2	5.0	0.2	5.0	0.2	5.0	0.2	19.0	0.8
						MON	4.0	0.1	5.0	0.1	5.0	0.1	5.0	0.1	19.0	0.4
			TOTAL FOR ALL ACTIVITIES				8.0	0.3	10.0	0.3	10.0	0.3	10.0	0.3	38.0	1.2
108	MONITOR SEABIRD & MARINE MAMMAL POPULATIONS			N20 N02		MON	7.0	0.2	7.0	0.2	7.0	0.2	5.0	0.2	26.0	0.8
						MON	3.0	0.1	3.0	0.1	3.0	0.1	10.0	0.2	19.0	0.5
						MON							15.0	0.1	15.0	0.1

APPENDIX B

PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICEWIDE ISSUE	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
108	MONITOR SEABIRD & MARINE			N20 N02			(CONT'D from previous page)									
			TOTAL FOR ALL ACTIVITIES				10.0	0.3	10.0	0.3	10.0	0.3	30.0	0.5	60.0	1.4
109	MONITOR HUMAN IMPACTS TO BACKCOUNTRY RESOURCES			N18 N20		MON	8.0	0.3	8.0	0.3	8.0	0.3	8.0	0.3	32.0	1.2
			TOTAL FOR ALL ACTIVITIES				8.0	0.3	8.0	0.3	8.0	0.3	8.0	0.3	32.0	1.2
112	INVENTORY BIOLOGICAL RESOURCES ON COAST			N20 N18		RES	100.0	4.0	40.0	1.0	20.0	0.5			160.0	5.5
						RES	10.0	0.3	10.0	0.3	10.0	0.3	10.0	0.3	40.0	1.2
			TOTAL FOR ALL ACTIVITIES				110.0	4.3	50.0	1.3	30.0	0.8	10.0	0.3	200.0	6.7
116	DEVELOP DATA BASE OF NATURAL RESOURCES			N24 N20		MON	3.0	0.1	3.0	0.1	3.0	0.1	3.0	0.1	12.0	0.4

APPENDIX B

PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICEWIDE ISSUE	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
116	DEVELOP DATA BASE OF			N24 N20			(CONT'D from previous page)									
				TOTAL FOR ALL ACTIVITIES			3.0	0.1	3.0	0.1	3.0	0.1	3.0	0.1	12.0	0.4
119	MANAGE MINING ACTIVITIES & MINERAL DEVELOPMENT		STRC	N10 N19		MIT	20.0	0.5	20.0	0.5	20.0	0.5	20.0	0.5	80.0	2.0
						PRO	10.0	0.4	10.0	0.3	10.0	0.3	10.0	0.3	40.0	1.3
				TOTAL FOR ALL ACTIVITIES			30.0	0.9	30.0	0.8	30.0	0.8	30.0	0.8	120.0	3.3

APPENDIX B

CULTURAL
PROGRAMMING SHEET I
CURRENT YEAR FUNDED ACTIVITIES
($ in thousands)

FY: 91
PARK: KEFJ
REGION: ARO

PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICEWIDE ISSUE	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
206	MANAGE COLLECTIONS: NATURAL & CULTURAL		OBJC	C09 C25		PRO	5.0	0.2	5.0	0.2	5.0	0.2	5.0	0.2	20.0	0.8
						PRO	10.0	0.4	10.0	0.4					20.0	0.8
			TOTAL FOR ALL ACTIVITIES				15.0	0.6	15.0	0.6	5.0	0.2	5.0	0.2	40.0	1.6
207	MONITOR OIL SPILL IMPACTS ON CULTURAL RESOURCES		COMB	C17 C22		MON	3.0	0.1	3.0	0.1	3.0	0.1	3.0	0.1	12.0	0.4
						MON	20.0	0.7	10.0	0.4					30.0	1.1
						MON					3.0	0.1			3.0	0.1
			TOTAL FOR ALL ACTIVITIES				23.0	0.8	13.0	0.5	6.0	0.2	3.0	0.1	45.0	1.6
209	CONDUCT DATA RECOVERY AT MCARTHUR PASS SITE		SITE	C14 C20		MIT	20.0	0.5							20.0	0.5
						MIT	80.0								80.0	
			TOTAL FOR ALL ACTIVITIES				100.0	0.5							100.0	0.5

APPENDIX B

CULTURAL
PROGRAMMING SHEET I
CURRENT YEAR FUNDED ACTIVITIES
($ in thousands)

PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICEWIDE ISSUE	FUNDING SOURCE	ACT TYPE	CURRENT YEAR $$	CURRENT YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
211	INTERPRET LOCAL HERITAGE		COMB	C26												
						INT	2.0	0.1	3.0	0.2	6.0	0.3	6.0	0.3	17.0	0.9
			TOTAL FOR ALL ACTIVITIES				2.0	0.1	3.0	0.2	6.0	0.3	6.0	0.3	17.0	0.9
214	PREPARE ADMINISTRATIVE HISTORY			C08												
						ADM	10.0	0.3							10.0	0.3
			TOTAL FOR ALL ACTIVITIES				10.0	0.3							10.0	0.3

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
1	101	ASSESS DISTRIBUTION AND ABUNDANCE OF FISH			N16 N19	REGN-NR	RES	60.0	1.0	50.0	1.0	20.0	0.5			130.0	2.5
						PARK-NR	RES	3.0	0.2	3.0	0.2	1.0	0.1			7.0	0.5
		TOTAL FOR ALL ACTIVITIES						63.0	1.2	53.0	1.2	21.0	0.6			137.0	3.0
2	102	MONITOR GLACIAL CHANGE: AREAL EXTENT & ELEVATION			N20	RGNR-OTH	MON	40.0	1.0	30.0	0.8	15.0	0.2			85.0	2.0
						REGN-NR	MON	10.0	0.3	10.0	0.2	2.0	0.1			22.0	0.6
						PARK-NR	MON	10.0	0.3	10.0	0.3	3.0	0.1			23.0	0.7
		TOTAL FOR ALL ACTIVITIES						60.0	1.6	50.0	1.3	20.0	0.4			130.0	3.3
3	103	ECOSYSTEM DEVELOPMENT ON DEGLACIATED AREAS			N20 N22	REGN-NR	RES	15.0	0.3	15.0	0.3	10.0	0.2			40.0	0.8
		TOTAL FOR ALL ACTIVITIES						15.0	0.3	15.0	0.3	10.0	0.2			40.0	0.8
4	105	STUDY WOLVERINE MOVEMENTS ON KENAI PENINSULA			N19 N20	REGN-NR	RES	5.0	0.2	10.0	0.5	10.0	0.5			25.0	1.2
						PARK-NR	RES	3.0	0.1	3.0	0.1					6.0	0.2

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
4	105	STUDY WOLVERINE MOVEMENTS			N19 N20			(CONT'D from previous page)									
		TOTAL FOR ALL ACTIVITIES						8.0	0.3	13.0	0.6	10.0	0.5			31.0	1.4
5	110	STUDY BLACK BEAR HOME RANGE & HABITAT USE			N20 N18	REGN-NR	RES	70.0	1.0	60.0	1.0	30.0	1.0			160.0	3.0
						PARK-NR	RES	5.0	0.1	5.0	0.1	3.0	0.1			13.0	0.3
		TOTAL FOR ALL ACTIVITIES						75.0	1.1	65.0	1.1	33.0	1.1			173.0	3.3
11	111	INVENTORY MAMMAL & BIRD SCAVENGERS ALONG COAST			N20 N18	PARK-NR	RES	5.0	0.2	5.0	0.2					10.0	0.4
						REGN-NR	RES	5.0	0.1	5.0	0.1					10.0	0.2
		TOTAL FOR ALL ACTIVITIES						10.0	0.3	10.0	0.3					20.0	0.6
10	113	INVENTORY PHYSICAL & CHEMICAL WATER RESOURCES			N11 N20	WATER RES	RES	50.0	1.0	50.0	1.0	20.0	0.5			120.0	2.5
						PARK-NR	RES	5.0	0.1	5.0	0.1					10.0	0.2

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
10	113	INVENTORY PHYSICAL &			N11 N20			(CONT'D from previous page)									
		TOTAL FOR ALL ACTIVITIES						55.0	1.1	55.0	1.1	20.0	0.5			130.0	2.7
7	114	MONITOR AIR QUALITY & WEATHER CONDITIONS			N14 N20	PARK-NR	MON	3.0	0.1	2.0	0.1	2.0	0.1	2.0	0.1	9.0	0.4
		TOTAL FOR ALL ACTIVITIES						3.0	0.1	2.0	0.1	2.0	0.1	2.0	0.1	9.0	0.4
6	115	GATHER CLIMATE DATA & INFORMATION			N24 N20	PARK-NR	RES	3.0	0.1							3.0	0.1
		TOTAL FOR ALL ACTIVITIES						3.0	0.1							3.0	0.1
8	117	DEVELOP A GEOGRAPHIC INFORMATION SYSTEM		COMB	N24 N20	REGN-NR	ADM	50.0	1.0	30.0	1.0	30.0	1.0	30.0		140.0	3.0
		TOTAL FOR ALL ACTIVITIES						50.0	1.0	30.0	1.0	30.0	1.0	30.0		140.0	3.0

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
9	118	MAP PARK VEGETATION			N20 N17	PARK-NR	RES	40.0								40.0	
		TOTAL FOR ALL ACTIVITIES						40.0								40.0	

APPENDIX B

CULTURAL
PROGRAMMING SHEET 2
UNFUNDED ACTIVITIES
($ in thousands)

FY: 91
PARK: KEFJ
REGION: ARO

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
1	201	CONDUCT ARCHEOLOGICAL SURVEY & INVENTORY		SITE	C02 C14	REGN-CR	RES	40.0	1.5	80.0	2.0	30.0	1.0			150.0	4.5
		TOTAL FOR ALL ACTIVITIES						40.0	1.5	80.0	2.0	30.0	1.0			150.0	4.5
2	202	COMPLETE HISTORIC RESOURCES STUDY (HRS)		COMB	C05 C02	REGN-CR	RES	30.0	1.0	20.0	0.5					50.0	1.5
		TOTAL FOR ALL ACTIVITIES						30.0	1.0	20.0	0.5					50.0	1.5
4	203	PRODUCE ARCHEOLOGICAL OVERVIEW & ASSESSMENT		COMB	C01 C02	REGN-NR	RES	20.0	0.5	10.0	0.3					30.0	0.8
						PARK-NR	RES	3.0	0.1	2.0	0.1					5.0	0.2
		TOTAL FOR ALL ACTIVITIES						23.0	0.6	12.0	0.4					35.0	1.0
5	204	PRODUCE ETHNOGRAPHIC OVERVIEW & ASSESSMENT		ETHN	C04 C01	REGN-NR	RES	20.0	0.5							20.0	0.5
						NRNON NPS	RES	10.0	0.3							10.0	0.3

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
5	204	PRODUCE ETHNOGRAPHIC		ETHN	C04 C01			(CONT'D from previous page)									
		TOTAL FOR ALL ACTIVITIES						30.0	0.8							30.0	0.8
3	205	CONDUCT ORAL HISTORIES & LIFE HISTORIES		ETHN	C04 C10												
						REGN-NR	RES	30.0	1.0							30.0	1.0
						PARK-NR	RES	10.0	0.3							10.0	0.3
		TOTAL FOR ALL ACTIVITIES						40.0	1.3							40.0	1.3
9	208	MONITOR RESOURCE IMPACTS ON CULTURAL PROPERTIES		COMB	C17 C19												
						PARK-CR	MON	2.0	0.1	2.0	0.1	2.0	0.1	2.0	0.1	8.0	0.4
						REGN-CR	MON	10.0	0.4	6.0	0.2					16.0	0.6
		TOTAL FOR ALL ACTIVITIES						12.0	0.5	8.0	0.3	2.0	0.1	2.0	0.1	24.0	1.0
6	210	PRESERVE AND PROTECT HISTORIC STRUCTURES		STRC	C07 C21												
						REHAB	MIT	30.0	0.6	20.0	0.4					50.0	1.0

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
6	210	PRESERVE AND PROTECT		STRC	C07 C21			(CONT'D from previous page)									
		TOTAL FOR ALL ACTIVITIES						30.0	0.6	20.0	0.4					50.0	1.0
10	212	DEVELOP MANAGEMENT PLAN: NATIVE LAND CONVEYANCES		COMB	C22 C26	PARK-CR	ADM	10.0	0.3							10.0	0.3
						REGN-CR	ADM	1.0	0.3							1.0	0.3
		TOTAL FOR ALL ACTIVITIES						11.0	0.6							11.0	0.6
11	213	DEVELOP SITE MGT. PLAN FOR NUKALASKA MINE		COMB	C11 C07	PARK-CR	ADM	10.0	0.3							10.0	0.3
						REGN-CR	ADM	10.0	0.3							10.0	0.3
		TOTAL FOR ALL ACTIVITIES						20.0	0.6							20.0	0.6
7	215	REMOVE HAZARDOUS WASTES AT HISTORIC MINE SITES		COMB	C10 C24	REHAB	MIT	10.0	0.2							10.0	0.2

APPENDIX B

PK PRI	PROJ STMT NUM	PROJECT OR ACTIVITY TITLE	PKG NUM	CULT RES TYPE	SERVICE WIDE ISSUES	FUNDING SOURCE	ACT TYPE	STARTING YEAR $$	STARTING YEAR FTE	OUTYEAR 1 $$	OUTYEAR 1 FTE	OUTYEAR 2 $$	OUTYEAR 2 FTE	OUTYEAR 3 $$	OUTYEAR 3 FTE	TOTAL $$	TOTAL FTE
7	215	REMOVE HAZARDOUS WASTES	COMB	C10 C24				(CONT'D from previous page)									
		TOTAL FOR ALL ACTIVITIES						10.0	0.2							10.0	0.2
8	216	CONDUCT EVALUATION STUDY AT DENTON SITE	SITE	C14		REGN-CR	RES	30.0	1.0							30.0	1.0
						PARK-CR	RES	2.0	0.1							2.0	0.1
		TOTAL FOR ALL ACTIVITIES						32.0	1.1							32.0	1.1
12	217	WRITE CULTURAL LANDSCAPE REPORT: NUKA BAY DISTRICT		C11 C24		PARK-CR	ADM	6.0	0.2							6.0	0.2
						REGN-CR	ADM	14.0	0.4							14.0	0.4
		TOTAL FOR ALL ACTIVITIES						20.0	0.6							20.0	0.6

APPENDIX B

APPENDIX C

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

Place and X in the appropriate column. Leave columns blank if document is not required for the park. Remember that items in the first section, PLANNING DOCUMENTS, may also apply to natural resources. See NPS-28, Chapter 2 for description of each inventory or study.

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
PLANNING DOCUMENTS			
Preauthorization and Authorization	X		
Statement for Management (SFM)		X	
Outline of Planning Requirements (OPR)			X
General Management Plan (GMP)		X	
Development Concept Plan (DCP)		X	
Resources Management Plan (RMP)		X	
Interpretive Prospectus (IP)	X		
SERVICEWIDE INVENTORIES, LISTS, CATALOGS, AND REGISTERS			
Cultural Resources Bibliography (CRBIB)			X
Cultural Sites Inventory (CSI)			X
List of Classified Structures (LCS)			X
National Catalog of Museum Objects		X	
National Register of Historic Places		X	

APPENDIX C

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
BASIC CULTURAL RESOURCE DOCUMENTS			
Archeological Overview and Assessment			X
Archeological Identification Studies			X
Archeological Evaluation Studies			X
Ethnographic Overview & Assessment			X
Ethnographic Oral Histories & Life Histories			X
Ethnographic Program			X
Historical Base Map			X
Historic Resource Study (HRS)			X
Park Administrative History		X	
Scope of Collection Statement	X		
SPECIAL RESOURCE STUDIES AND PLANS			
Archeological & Ethno. Collections Studies		X	
Archeological Data Recovery Studies			X
Collection Management Plan		X	
Collection Storage Plan		X	
Collection Condition Survey		X	

APPENDIX C

CULTURAL RESOURCE DOCUMENTATION CHECKLIST

TITLE	CURRENT AND APPROVED	INCOMPLETE; NEEDS REVISION OR UPDATING	NEEDED
SPECIAL RESOURCE STUDIES AND PLANS (cont.)			
Cultural Landscape Report (CLR)			X
Ethnohistory			X
Exhibit Plan		X	
Historic Furnishings Report			X
Historic Structure Preservation Guide (HSPG)			X
Historic Structure Report			X
Social Impact Study	X		
Special History Study			X
Traditional Use Study			X

APPENDIX D

SUMMARY CHART FOR CULTURAL LANDSCAPES

Significance		Condition				Impacts				Documentation		
		Good	Fair	Poor	Unknown	Severe	Moderate	Low	Unknown	Good	Fair	Poor
National												
State & Regional												
Local												
Not Evaluated	3				3		3				2	1
TOTALS	3				3		3				2	1

APPENDIX E

LIST OF RELATED ACTION PLANS

Alaska Interagency Fire Management Plan, Kenai Peninsula Planning Area. April 1984.

Kenai Fjords National Park:

Land Protection Plan. 1988.

Draft - Oil and Hazardous Substances Spill Prevention and Emergency Response Plan. March 1989.

Interpretive Prospectus. 1990.

Park Trail Management Plan. April 1991.

APPENDIX F

ANNUAL STATUS OF PROJECTS AND ACCOMPLISHMENT REPORT

The following brief descriptions of projects indicate accomplishments by the Resources Management Division at Kenai Fjords National Park during 1991. Most of these projects are documented by the NPS Investigator Annual Reports.

Bear Management

Bear proof storage containers were provided for summer Student Conservation Service crews working on the Haridng Icefield Trail during summer. A cable was strung 20 feet above ground surface in the Exit Glacier walk-in camp ground to allow visitors to store food out of reach of bears. A bear encounter report form was developed to better track bear-human interactions. All observations of bears were recorded on Natural History Observation Cards and entered into the park data base. Case incidient records were written when appropriate. One black bear bit into a Counter Assault cannister that two coast rangers left with campers in Nuka Bay. That bear was not seen again near human food caches.

Holocene Glaciation

This project was continued in Northwestern Fjord by Dr. Parker Calkin and graduate student Greg Wiles, State University of New York, Dept. of Geology, Buffalo, NY with cooperation from the park staff. Two stands of interstadial trees were discovered and sampled for radio-carbon dating. Living trees were also cored for dating analysis. Glacial deposits were located and described. The project will aid understanding of past glacial advances and retreats and perhaps lend some understanding to regional climatic fluctuations.

Kenai Fjords Visitor Study

Margaret Littlejohn submitted the final report for the visitor use study which was reviewed by the RMS.

Plant Succession Studies at Exit Glacier

Dot Helm of the University of Alaska led plant succession studies at Exit Glacier under an NSF grant and NPS Regional Base Funding. The park supplied storage space and staff helped with other logistics. She will continue studies next season. A primary goal of this research is to determine the role of mycorhizae in primary plant succession on a recently deglaciated surface.

Mountain Goat Activity Budget Study at Exit Glacier

Mountain Goat habitat use and percentage of time spent by activity were assessed by seasonal rangers and VIPs at Exit Glacier. Summer staff at Exit Glacier have been too busy with visitors and trail maintenance to adequately document goat activity during that busy season. Also, goats tend to move toward mountain peaks and ridges during that season. The purpose of the study is to document whether human visitation and activity in the area significantly alters goat activities and behavior. We now have a good idea how much time the goats spend at various locations with various activities.

Mountain Goat Trend Counts

Weather and availability of aircraft inhibited completion of the study comparing trend counts by helicopter and fixed-wing Super Cub. Counts were conducted by Super Cub only. Numbers were lower this year than the previous year. Counts in 1990 were higher by Super Cub, but greater numbers of young and better differentiation of age classes were possible by helicopter.

Bald Eagle Nest Surveys

Monitoring of bald eagle nests was continued by seasonal coastal ranger/biological technicians. A summary of nest surveys between 1986 and 1990 was written. We are attempting to delineate bald eagle territories with available data.

Monitor Changes in Coastal Glaciers

Surfaced-based photography is being used to monitor tidewater and coastal glaciers. The RMS and Biological Technician travel on the Kenai Ranger and photograph all visible coastal glaciers using 35 mm cameras with black and white and color slide film. Coordinates, bearing, weather conditions and other data are recorded. A data base was built documenting photo points. Photo points are located at sea using Loran See navigation on the vessel. The park plans are to convert to GPS navigation and location.

Monitor Seabird and Marine Mammal Populations

Glaucous-winged gull colony sites and marbled murrelet populations were assessed this summer. Gull colony counts of nests, eggs and chicks were conducted during the third week of June prior to hatching, if possible. Dawn counts of brachyramphus murrelets wee conducted twice at Exit Glacier/Resurrection River area, Aialik Bay and McCarty Fjords. Murrelet detections are lowest near recently deglaciated habitat. A marbled murrelet nest was unexpectedly discovered in Northwestern Fjord on June 30, 1991. This was reported at the Marbled Murrelet Workshop at the Alaska Bird Conference in Anchorage, November 1991.

Maintain Natural History Observation Database

Park staff contributed observation cards of unusual observations which were entered into a DBASE III+ data base. These data will be entered into a GIS eventually.

Monitor Terminus of Exit Glacier

The park continued to measure distances from three stakes on set bearings to the ice edge of Exit Glacier throughout the year. In September the park acquired a transit level with year end monies to make more detailed measurements of the glacier terminus. This data is shared with the US Geological Survey and research scientists. This project helps managers plan spring trail repair and rehabilitation needs.

Monitor Harding Icefield Trail Conditions

Funding for a project to rehabilitate and repair the Harding Icefield Trail was acquired following trail transects established the previous years which indicated serious erosion. Trail transects and soil/vegetation recovery continue to be monitored in September after the season's use.

Monitor Weather and Snow Conditions

A year round weather station is maintained at Exit Glacier. Data is reported to the National Weather Service monthly. Daily data recorded includes maximum and minimum temperatures, precipitation, snow depth and daily snow fall. Weather records are also kept during summer months in Aialik Bay and Nuka Bay.

A snow survey course is sampled once a month at Exit Glacier, and results are reported each month to the Soil Conservation Service in Anchorage. Data obtained includes snow depth, water content and snow layer characteristics such as crusts or icy layers.

Monitor Stream Gages

A stream profile gage is measured each morning along Exit Glacier Creek. A new River gage was installed on the Resurrection River Bridge near Exit Glacier by the National Weather Service, and that gage is also read daily from break-up to November. These data are radioed and called in by park staff to the NWS River Forecasting Division in Anchorage who issues flood warnings at appropriate times. More than one reading a day are obtained during times of flooding.

Remove Known Explosives from Abandoned Mining Sites

The RMS and Chief Ranger assisted the Regional Blasting Chief During June in locating and removing old dynamite and other unstable explosives from coastal mining sites in the park in the interest of providing for public health and safety. Some explosives in Beauty Bay could not be located due to persistent deep snows. They were located later in the summer by seasonal

staff and clearly marked with flagging and warning signs.

Monitor Coastal Cultural Resources

Seasonal park rangers visited ARPA sites, particularly MR-1 throughout the summer to monitor against looting and vandalism. The Nuka Bay ranger team monitored this site when research groups were scheduled to be in the area.

Survey Abandoned and Historic Mine Lands in Nuka Bay

The RMS assisted personnel from the Regional Office during July 1991 in locating abandoned historic mining sites in the Nuka Bay district. Several sites were documented and the group concluded that after the two weeks more work is needed to thoroughly document the sites.

ARPA Site Assessment

The Aialik Bay coastal rangers examined cultural resource sites along the entire coast of the park with an eye toward protection problems and future management concerns. A report was written and submitted to the Regional Office.

Stream Inventory and Assessments

Coastal rangers and biological technicians examined priority drainages to obtain measurements on physical parameters such as width, sinuosity, substrate types and other measurements classify them into the Rosgen Classification scheme. The data will also enable park managers to direct attention to significant salmon habitat. The BLM has requested information on some streams to aid with determinations of navigability.

Write Park Trail Plan

The park's resident trail specialist and Biological Technician wrote a park trail plan in March which was approved by April 1991. This plan identifies and classifies all of the park's trails and lays out a maintenance scheme.

Write a Revised Resource Management Plan

The park RMS has coordinated comments form Regional NPS staff and State employees in writing a completed draft RMP. This plan includes several project statements and addresses subsistence at Kenai Fjords National Park.

APPENDIX G.

LIST OF PERSONS AND AGENCIES CONTACTED

Attendees at Scoping Meeting, March 1990:

State of Alaska:

Jack Sinclair, DNR
Tina Cunning, ADF&G (Telephone Conference)

U.S. National Park Service:

Anne Castellina, Superintendent KEFJ
Peter Fitzmaurice, Chief Ranger KEFJ
Bud Rice, Resource Management Specialist KEFJ

Gary Vequist, ARO Natural Resource Specialist
Jeanne Schaaf, ARO Compliance Archeologist

Attendees at Follow-up Scoping Meeting, April 1990:

State of Alaska:

Al Carson, ADF&G
Rick Sennet, ADF&G

U.S. National Park Service:

Gary Vequist, ARO Natural Resource Specialist
Bud Rice, KEFJ Natural Resource Specialist

Other Contacts, Consultants:

State of Alaska:

Terry Haynes, ADF&G Satewide Subsistence Coordinator

U.S. National Park Service:

Jean Schwearingen, Regional Curator
Logan Hovis, Historian
Paul McLaughlin, Resource Management Specialist
Page Spencer, Environmental Specialist

APPENDIX H

BIBLIOGRAPHY OF CITED REFERENCES

Adams, Layne G. 1986. Mountain goat survey, Kenai Fjords National Park, 1985. NPS Alaska Region Natural Resources Survey and Inventory Report AR-86-01.

Amarol, Mike. 1989. Fish and Wildlife Service Endangered Species Specialist, USFWS Alaska Regional Office, Anchorage, Alaska.

Ahlstrand, Gary M. 1983. Dendrochronological evidence of the recent history of Exit Glacier. Unpubl. Report to Kenai Fjords NP.

Bailey, Edgar P. 1976. Breeding seabird distribution and abundance along the south side of the Kenai Peninsula, Alaska. U.S. Fish and Wildlife Service Admin. Rep. 67 pp.

Bailey, Edgar and Bud Rice. 1989. Assessment of injury to seabird and marine mammal populations along the southeast coast of the Kenai Peninsula, Alaska from the EXXON VALDEZ oil spill, during summer of 1989. USFWS and NPS Admin. Rep. 37 pp.

Bredthauer, S. R. and W. D. Harrison. 1984. Impact of glaciers on long-term basin water yield. UAF Institute of Water Resources Report IWR-106 pp 51-60.

Calkins, Donald G. and Kenneth W. Pitcher. 1982. Population assessment, ecology and trophic relationships of Steller sea lions in the Gulf of Alaska. ADF&G Final Report: Research Unit 243, Contract #03-5-022-69.

Day, Robert H., Karen L. Oakley, and David R. Barnard. 1983. Nest sites and eggs of Kittlitz's and marbled murrelets. The Condor, vol 85, No. 3.

Ellsworth, C. E. and R. W. Davenport. 1915. A water-power reconnaissance in South-central Alaska. USGS Water-supply Paper 372.

Field, William O. 1975. Mountain glaciers of the northern hemisphere. Vol. 1 & 2. American Geographical Society of New York.

Follows, Donald. 1978. Glacial landscapes and geology of the Harding Icefield complex, southern Kenai Mountains, Alaska. Geological research paper, Landscapes of Alaska Seminar, Anchorage Community College.

Grant, U. S. and D. F. Higgins. 1913. Coastal glaciers of Prince William Sound and Kenai Peninsula, Alaska. USGS

Bull. 526.

Hamilton, T.D. and B. Rice. 1989. Kenai Fjords and the Harding Icefield. In Guide to the geology of the Resurrection Bay - Eastern Kenai Fjords Area. Alaska Geological Society, Anchorage, AK.

Heusser, Calvin J. 1960. Late Pleistocene environments of North Pacific North America. American Geographical Society, special publication no. 35.

Janik, C. A. and P. F. Schempf. 1985. Peale's peregrine falcon (Falco peregrinus Pealei) studies in Alaska June 12-24, 1985. Unpubl. report of Raptor Management Studies, U.S. Fish and Wildlife Service, P.O. Box 1287, Juneau, AK 99802.

Johnston, Stuart and Harry R. Carter. 1985. Cavity-nesting marbled murrelets. The Wilson Bulletin, vol. 97, no. 1.

Jones, Stanley H. (Pers. Com.) USGS Water Resources Division, 4230 University Drive, Suite 210, Anchorage, AK 99508-4664.

Jones, Stanley H. and Chester Zenone. 1988. Flood of October 1986 at Seward, Alaska. USGS Alaska Water Resources Investigations report 87-4278.

Jubenville, Alan. 1985.

Kuletz, Kathy. Pers. Com. U.S. Fish and Wildlife Service, Anchorage, AK 99503.

Littlejohn, Margaret. 1991. Visitor Services Project, Kenai Fjords National Park. Cooperative Park Studies Unit, University of Idaho, Moscow, ID 83843

Martin, G.C., B.L. Johnson and U.S. Grant. 1915. Geology and mineral resources of Kenai Peninsula, Alaska. USGS Bulletin 587.

Mayo, L. R. and D. C. Trabant. 1984. Observed and predicted effects of climate change on Wolverine Glacier, southern Alaska. In Potential effects of carbon-induced climate changes in Alaska. Jennifer McBeath, ed. School of Ag. and Land Resources Mgt., UAF, Misc. Publ. 83-1.

Mayo, L. R. et. al. 1985. Growth of Wolverine Glacier, Alaska; determined from surface altitude measurements, 1974 and 1985. UAF Institute of Water Resources Rpt. IWR-108.

McMahan, J.D. and C.E. Holmes. 1987. Report of archaeological and historical investigations at Nuka Island and the adjacent Kenai Peninsula, Gulf of Alaska. Office of History and Archaeology: Report 5. Anchorage, AK.

Meier, Mark F. 1984. Contribution of small glaciers to global sea level. Science, 266: 4681, 418-421.

Milner, Alexander M. (Pers. Com.) Arctic Environmental Information Data Center, University of Alaska, Anchorage, AK. (907) 257-2720.

Milner, Alexander M. 1987. Colonization and ecological development of new streams in Glacier Bay National Park, Alaska. Freshwater Biology: 18, 53-70.

Milner, Alexander M. and Roland G. Bailey. 1989. Salmonid colonization of new streams in Glacier Bay National Park, Alaska. Aquaculture and Fisheries Management: 29 (2).

Mobley, Charles M., J.C. Haggarty, et al. 1990. The 1989 EXXON VALDEZ Cultural Resources Program. Exxon Shipping Co. and Exxon Co., USA, Anchorage, AK. Library of Congress no. 90-084146.

Modaferi, Ron. 1982. Black bear movement and home range study, Prince William Sound, Alaska. Alaska Federal Aid in Wildlife Restoration Final Report, Project W-17-11, 23 pp.

Murray, D. F. and R. Lipkin. 1987. Candidate threatened and endangered plants of Alaska. UAF Museum. ISBN-0-931163-03-X.

Murphy, E.C. and A.A. Hoover. 1981. Research study of reactions of wildlife to boating activity along Kenai Fjords coastline. Final Report for National Park Service contract no. CX-9000-8-000151.

National Climatic Data Center. 1990. Climatological data, Alaska. U.S.D.C., NOAA, ISSN 03364-5762.

Nibler, G.J. 1986. Report on the October 10-12, 1986 heavy rain and flooding in southcentral Alaska. Alaska River Forecast Center report, 14 pp.

Nichols, Lyman. 1985. Mountain goat fidelity to given areas by season and seasonal movements. Alaska Federal Aid in Wildlife Restoration Final Report, Projects W-21-1, W-21-2, W-22-1, W-22-2 and W-22-3. 72 pp.

Nishimoto, M. and B. Rice. 1987. A re-survey of seabirds and marine mammals along the south coast of the Kenai Peninsula, Alaska during summer 1986. USFWS Admin. Rep. 63 pp.

Oswood, M.W., Milner, A.M., and Irons, J. (In Press). "Climate change and Alaskan rivers and streams." In Global Warming and Freshwater Ecosystems (Eds. P. Firth and S. Fisher) Springer-Verlag, New York.

Pilgrim, Earl R. 1933. Nuka Bay District, in Stewart, B. D., Mining investigation and mine inspection in Alaska, biennium ending March 31, 1933: Alaska Mines and Minerals, p. 26-51.

Paton, Peter W.C., C.J. Ralph, H.R. Carter, and S.K. Nelson. 1990. Surveying marbled murrelets at inland forested sites; a guide. Pacific Southwest Research Station, General Technical Report PSW-120.

Pflaker, George. 1969. Tectonics of the March 27, 1964 Alaska earthquake. USGS Professional Paper 543-I.

Quinlan, Susan E. and J.H. Hughes. 1990. Location and description of a marbled murrelet tree nest site in Alaska. The Condor: 92:1068-1073.

Reynolds, Georgeanne Lewis. 1987. An archeological reconnaissance of the west side of the Resurrection River Valley, Kenai Fjords National Park, 1983. USDI, NPS Research/Resources Mgt. Rpt. AR-13.

Rice, Bud. 1987. Changes in the Harding Icefield, Kenai Peninsula, Alaska. Unpubl. M.S. paper, UAF School of Ag. and Land Resources Mgt. 116 pp.

Rice, Bud and Layne G. Adams. 1990. Mountain goat population study, Kenai Fjords National Park, 1990. NPS Alaska Region Natural Resources Survey and Inventory Report AR-90-__.

Rice, William D. and Page Spencer. 1991. Discovery of marbled murrelet nest. Unpubl. report. Kenai Fjords NP, P.O. Box 1727, Seward, AK 99664.

Richter, Donald H. 1970. Geology and lode gold deposits of the Nuka Bay area, Kenai Peninsula, Alaska. USGS Professional Paper 625-B.

Schaaf, Jeanne. 1988. The Denton Collection, Verdant Cove, Aialik Bay, Kenai Fjords National Park. NPS Alaska Regional Office. Restricted circulation.

Singer, Francis J. and Allan L. Lovaas. 1981. Mountain goat count, 1981, Kenai Fjords National Park. U.S.D.I. NPS Alaska Regional Office, Anchorage, AK.

Singer, Steven W., N.L. Naslund, S.A. Singer and C.J. Ralph. 1990. The Condor. Discovery and observation of two tree nests of the marbled murrelet. The Condor: 93:330-339.

Sloan, Charles E. 1985. Water resources and hydrologic hazards of the Exit Glacier area near Seward, Alaska. USGS Water Resources Investigations Rpt 85-4247.

Stanek, Ronald T. 1985. Patterns of wild resource use in

English Bay and Port Graham, Alaska. ADF&G Subsistence Division, Technical Paper No. 104. 226 pp.

Teben'kof, Captain 1st Rank M.D. 1852. Atlas of the Northwest coasts of America, with hydrographic notes. Translated and edited by R. A. Pierce. 1981. Alaska History, no. 21. Limestone Press.

Tetreau, Michael. 1991. Bald Eagle Nest Surveys in Kenai Fjords National Park, 1986 to 1990. Unpubl. Report, Kenai Fjords NP, P.O. Box 1727, Seward, AK 99664.

Tetreau, Michael. 1991. Park Trail Plan, Kenai Fjords National Park. Unpubl. Report, Kenai Fjords NP, P.O. Box 1727, Seward, AK 99664.

U.S. Department of Agriculture, Soil Conservation Service. 1990. Alaska Snow Surveys. 201 E. 9th Ave., Suite 300, Anchorage, Alaska.

U.S. National Park Service. 1975. Final environmental statement for the proposed Harding Icefield-Kenai Fjords National Monument, Alaska. U.S. GPO 0-565-653.

_____. 1982. Resources Management Plan for Kenai Fjords National Park. USDI, NPS Denver Service Center, NPS-1994.

_____. 1984. General Management Plan for Kenai Fjords National Park. USDI, NPS Denver Service Center, NPS-2059A.

_____. 1988. Final environmental impact statement for wilderness recommendation, Kenai Fjords National Park, Alaska. USDI, NPS Denver Service Center, NPS-D-9A.

U.S. National Park Service and ISER. 1988. A proposal for a comprehensive science program in the Alaska Region with an analysis of the economic effects. NPS and UAA. 44pp.

Vequist, Gary and Mike Nishimoto. 1990. Seabird survey on the coast of Kenai Fjords during the EXXON VALDEZ oil spill. NPS Alaska Region Natural Resources Report AR-90/04.

Viereck, L.A., C.T. Dyrness and A.R. Batten. The 1986 revision of the Alaska vegetation classification. Institute of Northern Forestry, USDA Forest Service, Fairbanks, Alaska.

Wiles, G. C. and P. E. Calkin. 1990. Neoglaciation in the southern Kenai Mountains, Alaska. In press Annals of Glaciology.